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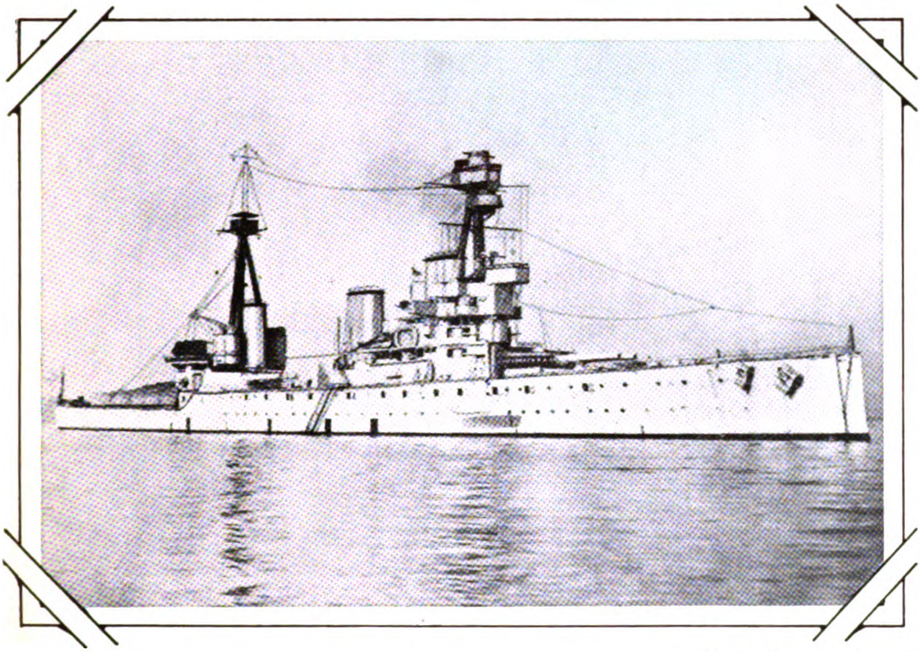

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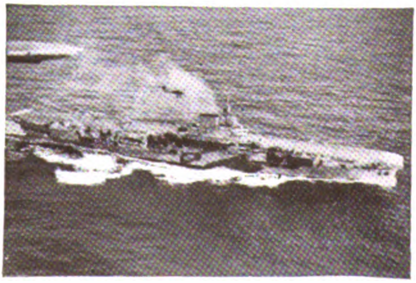

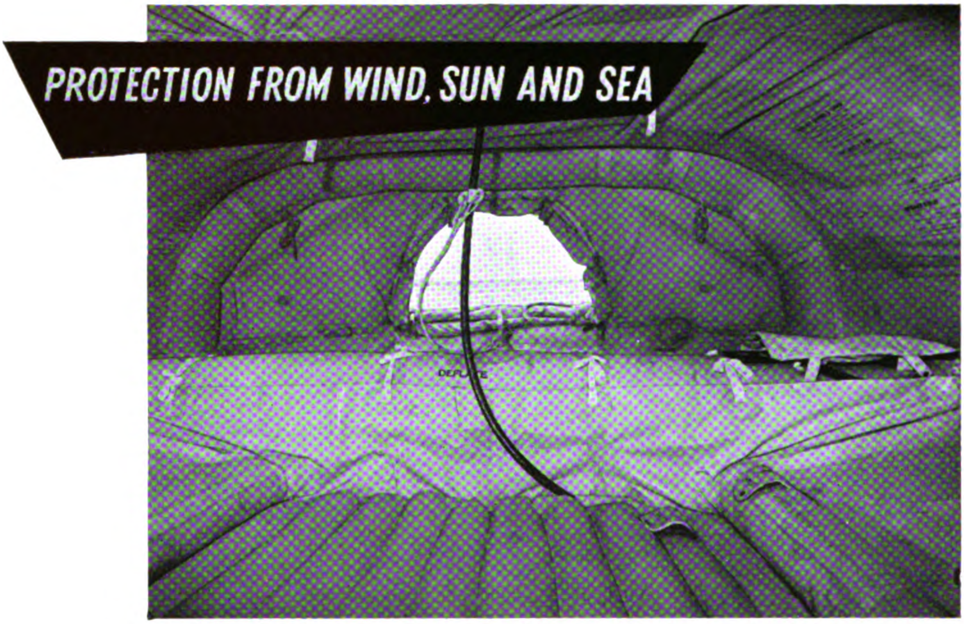

Interior view of raft showing rain-collecting hose and emergency hand bellows

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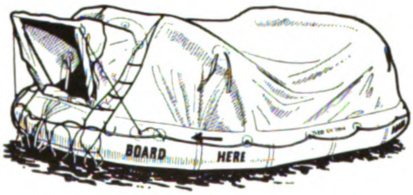

The automatically inflated 20 man liferaft with the inflatable floor and double tent and sleeve entrances (here shown rigged for tropical use).

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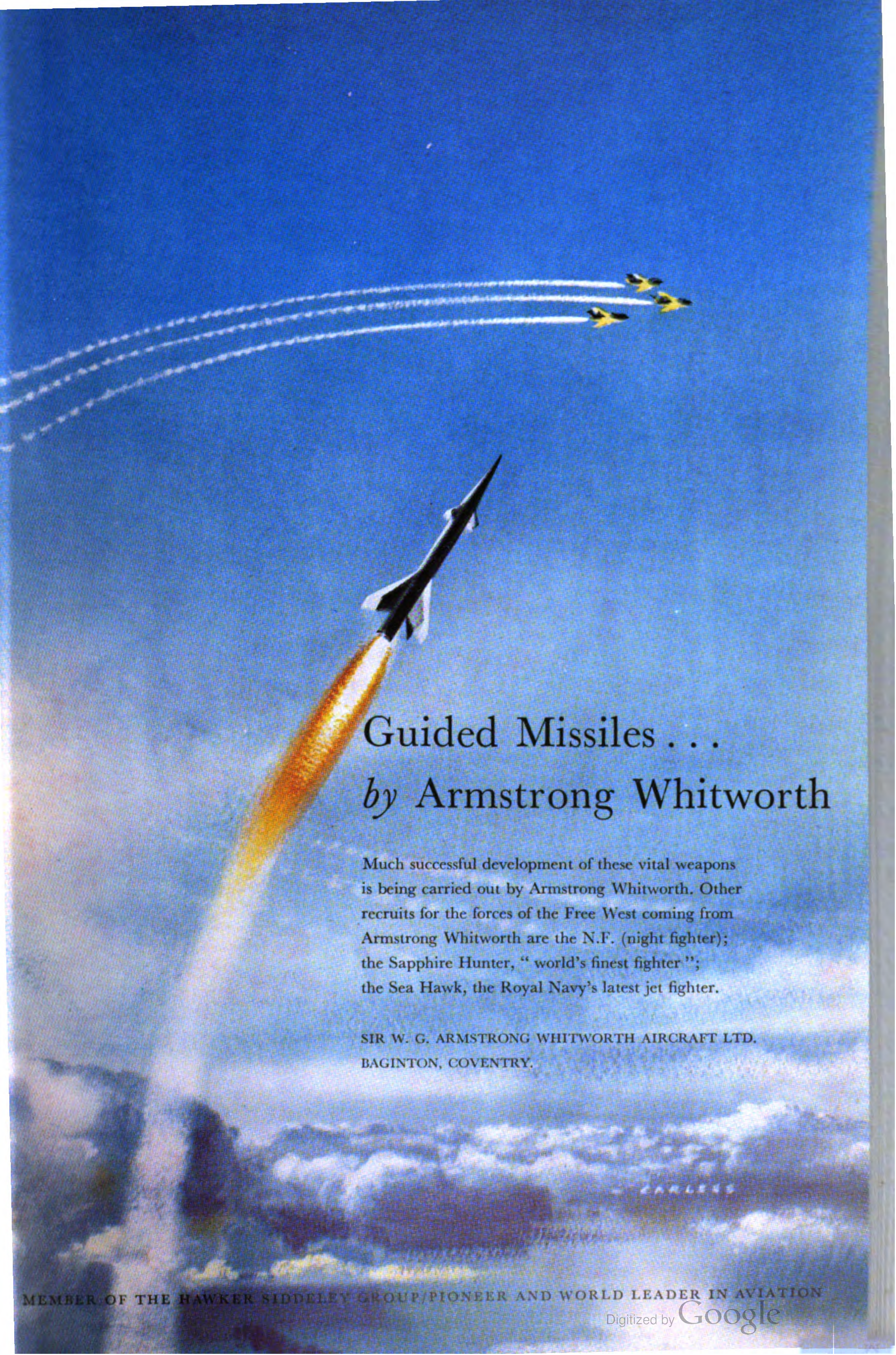

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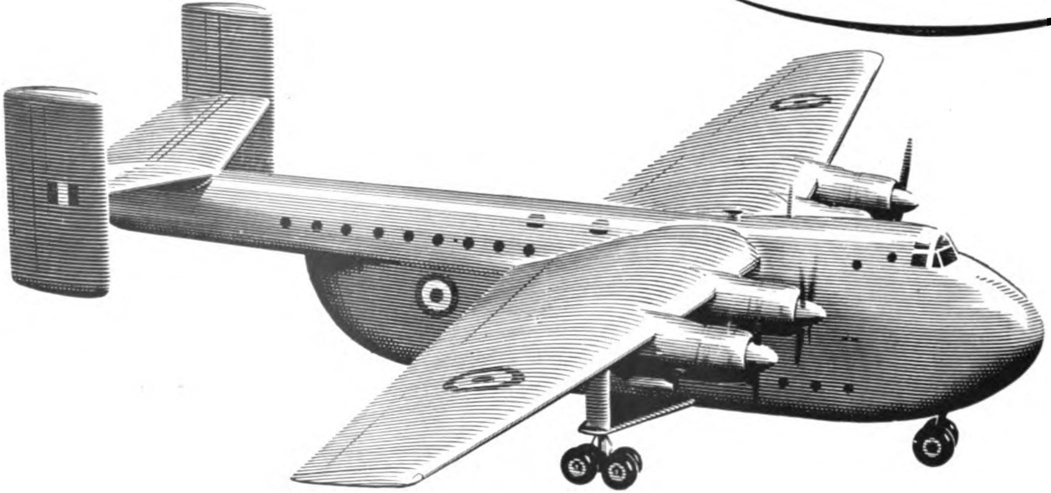

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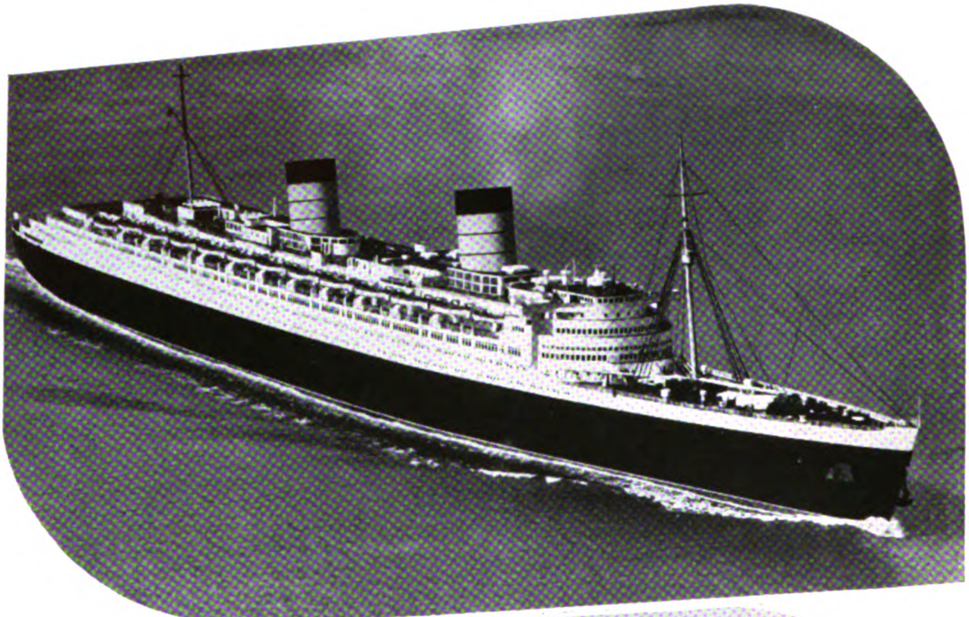

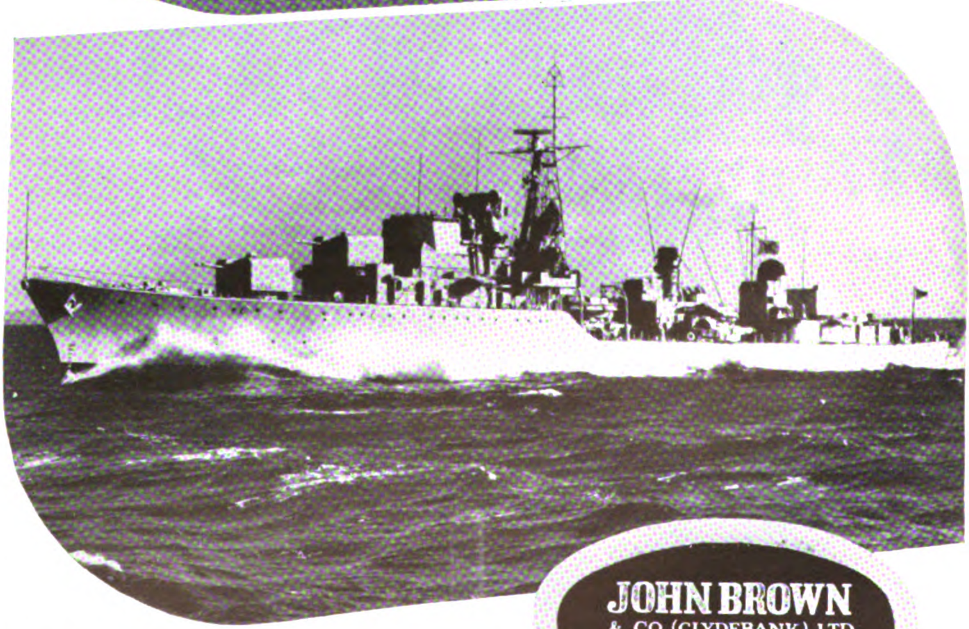

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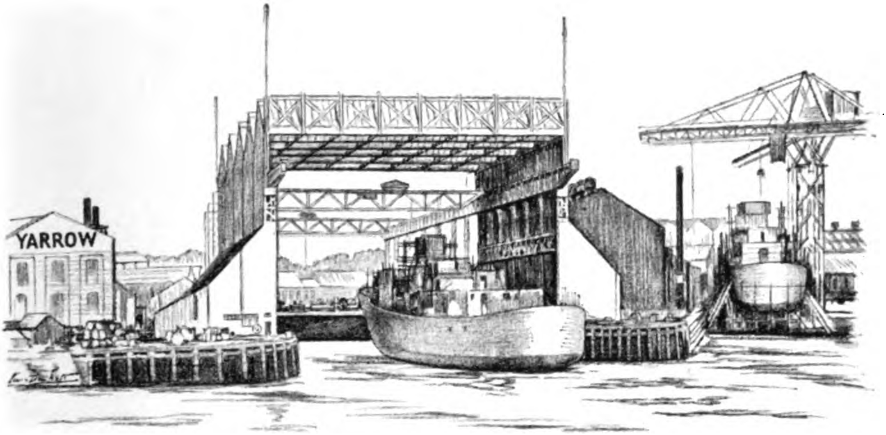

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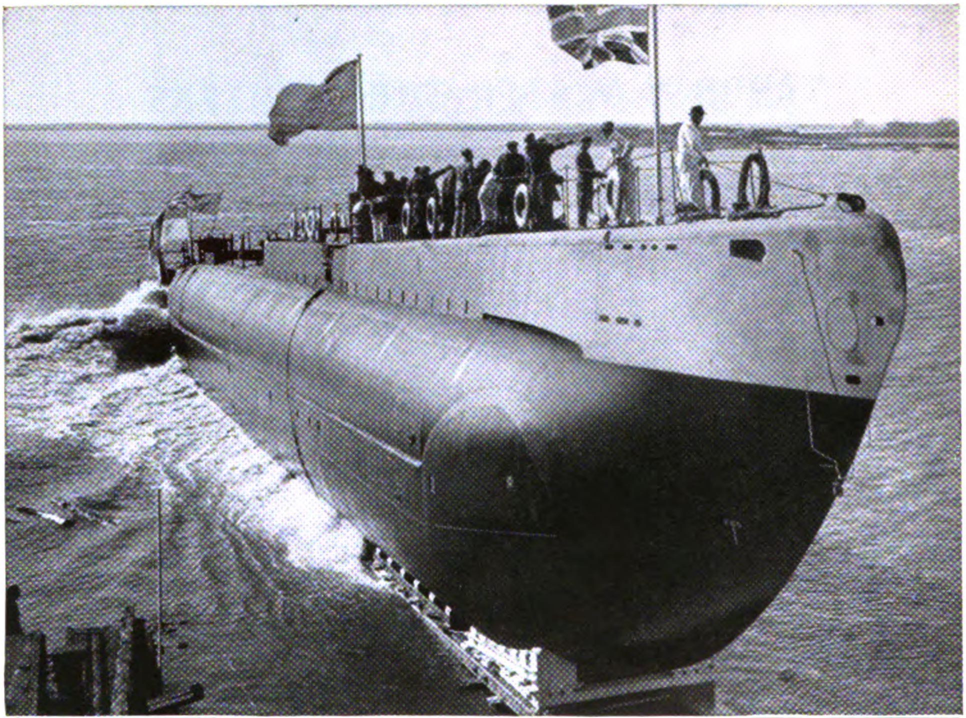

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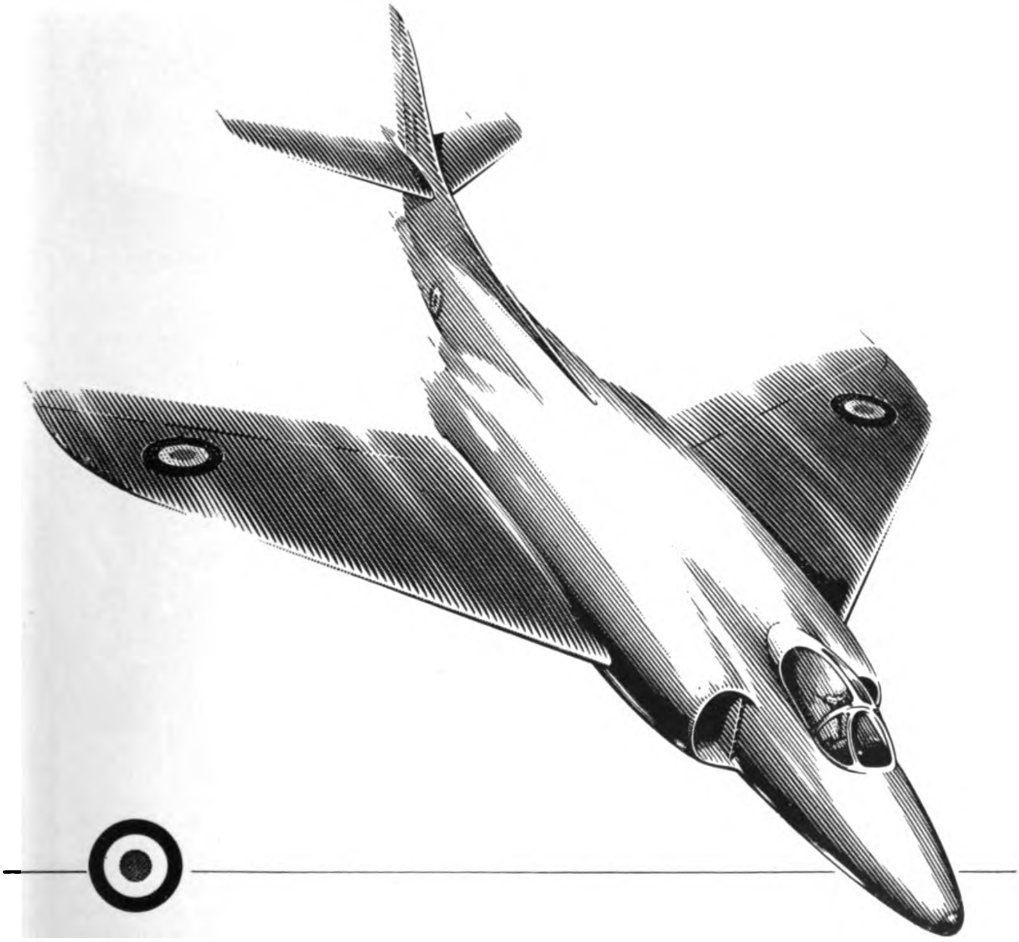

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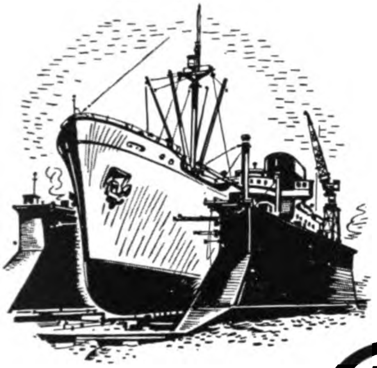

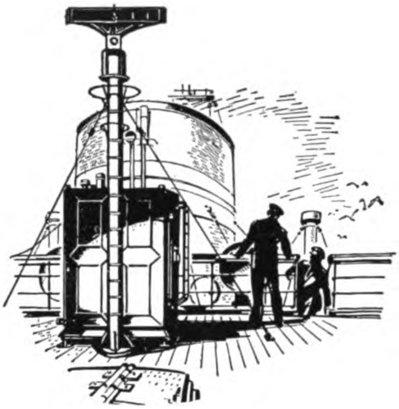

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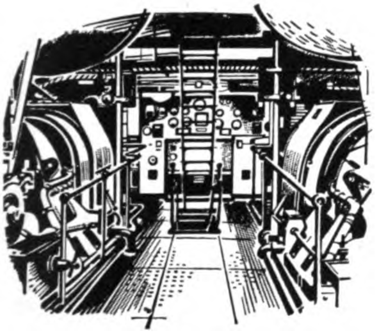

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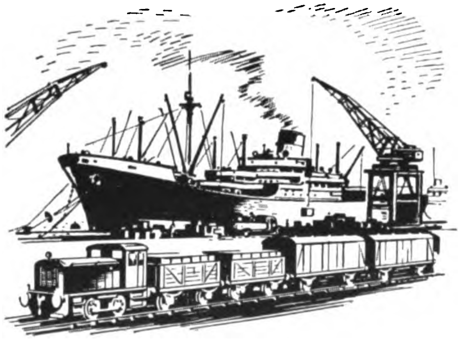

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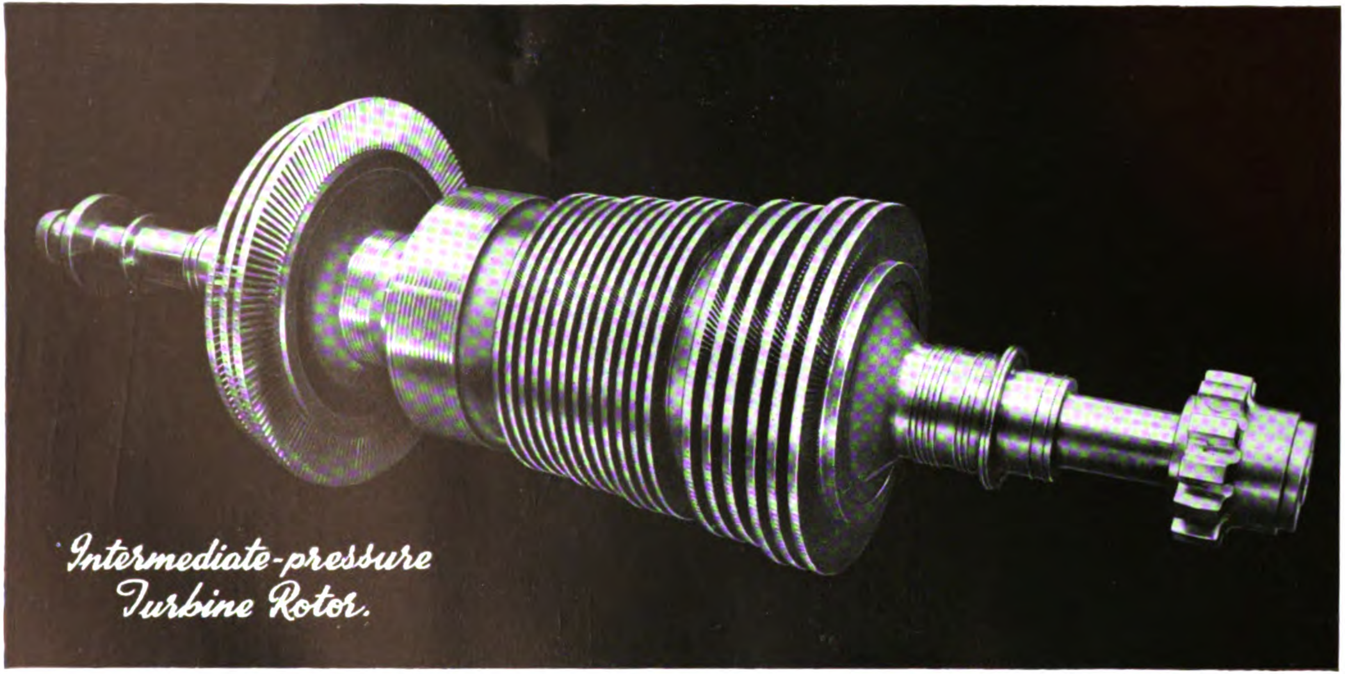

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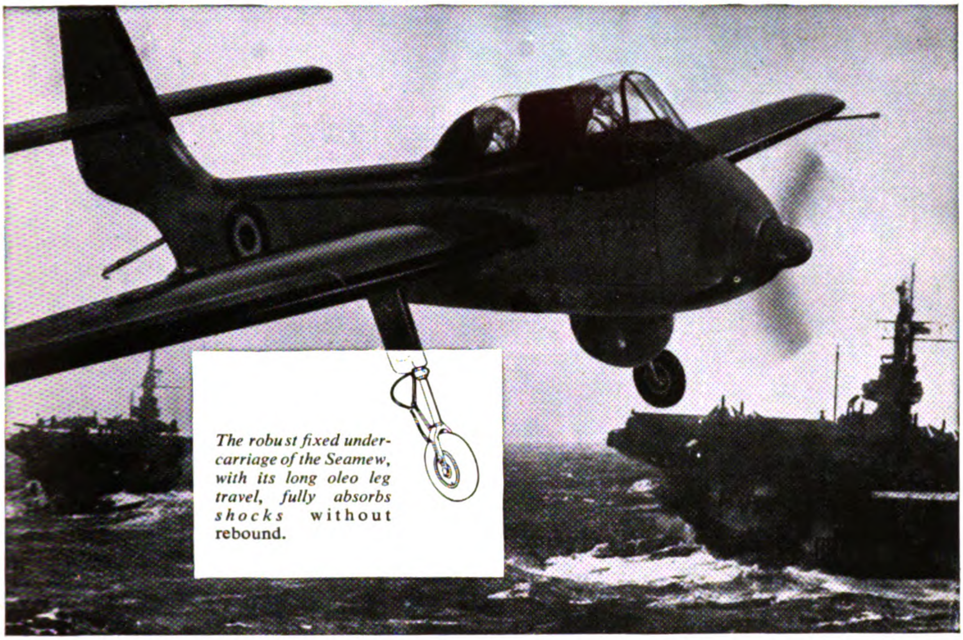
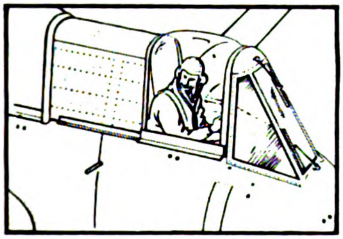
Submarine weather – *Seamew* weather



The robust fixed undercarriage of the Seamew, with its long oleo leg travel, fully absorbs shocks without rebound.



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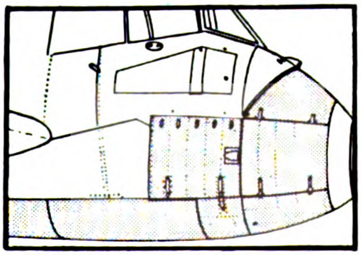

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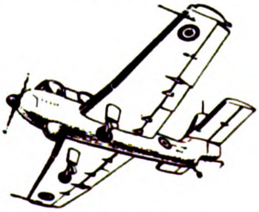
The ***Short*** answer is the ***Seamew***



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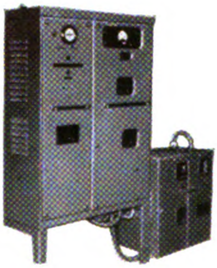

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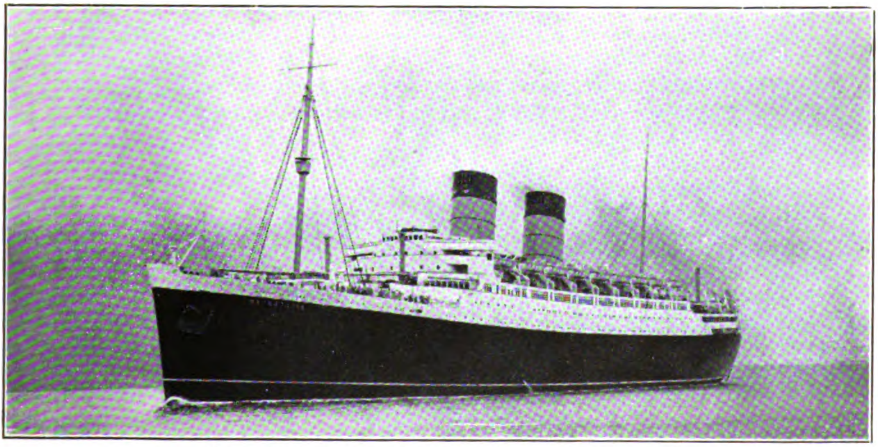

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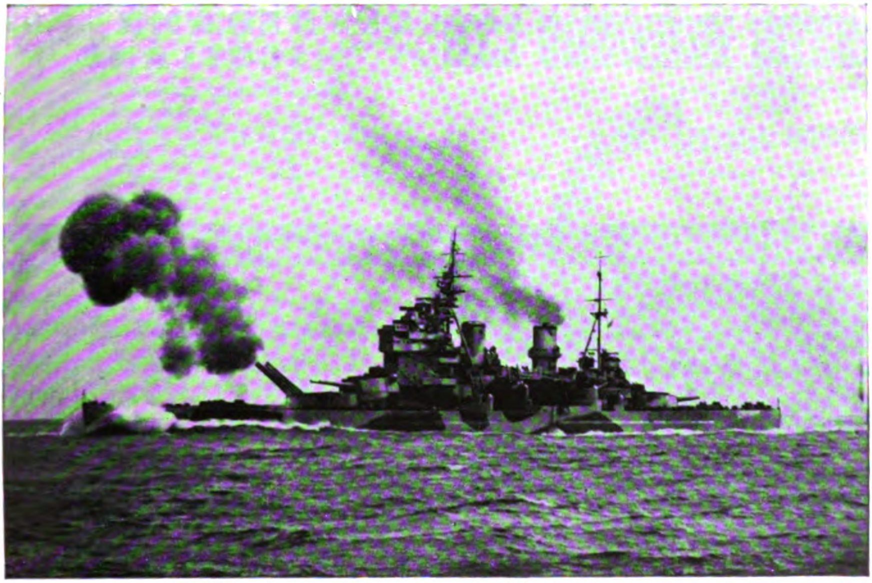

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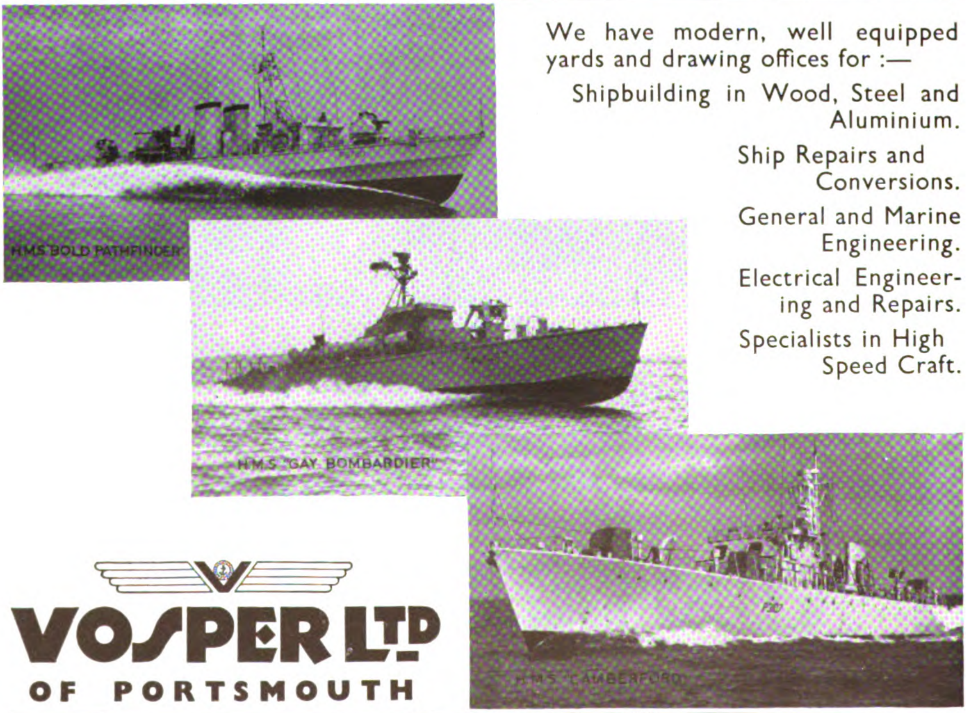

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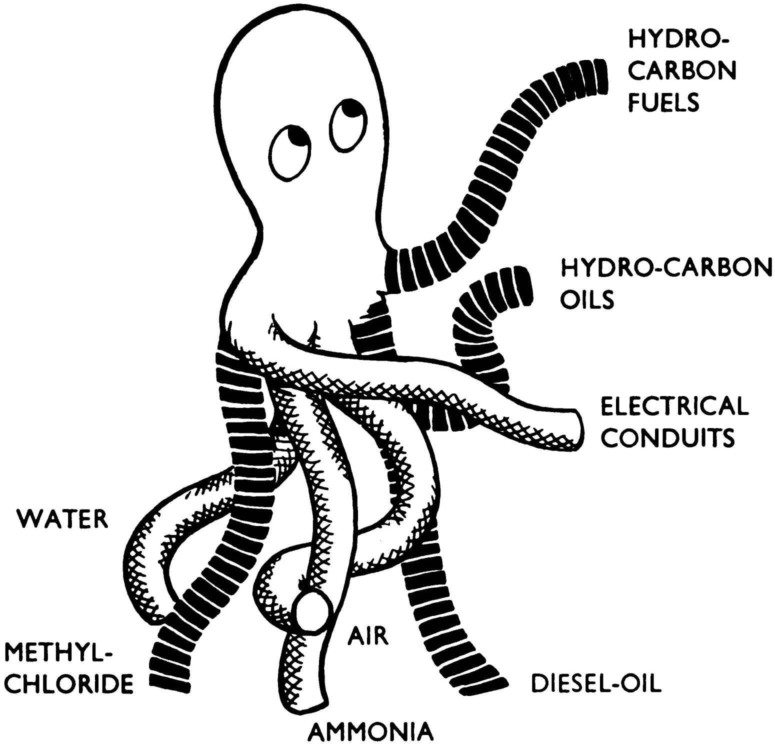

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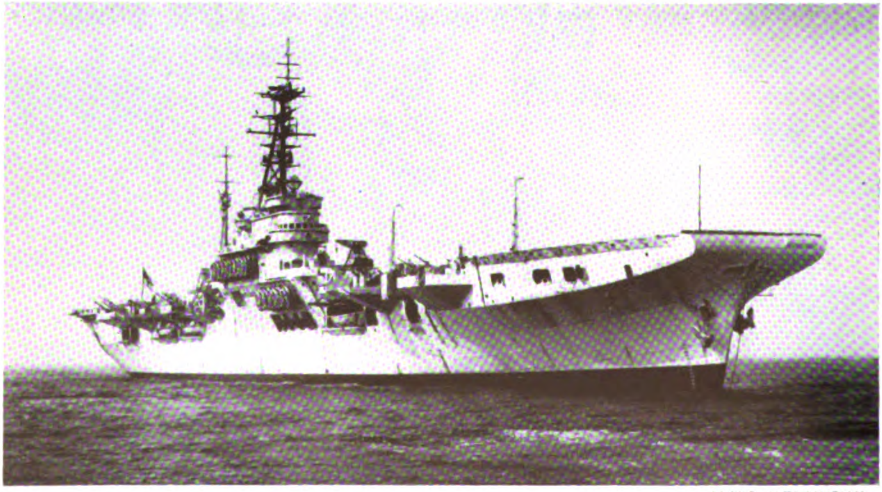

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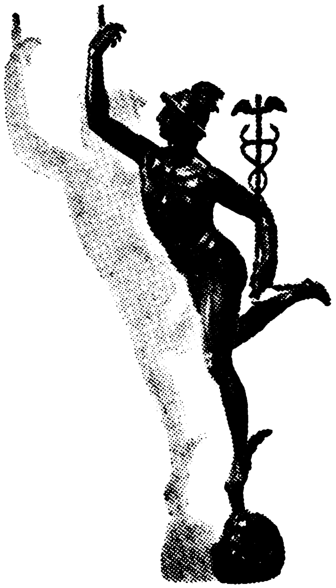

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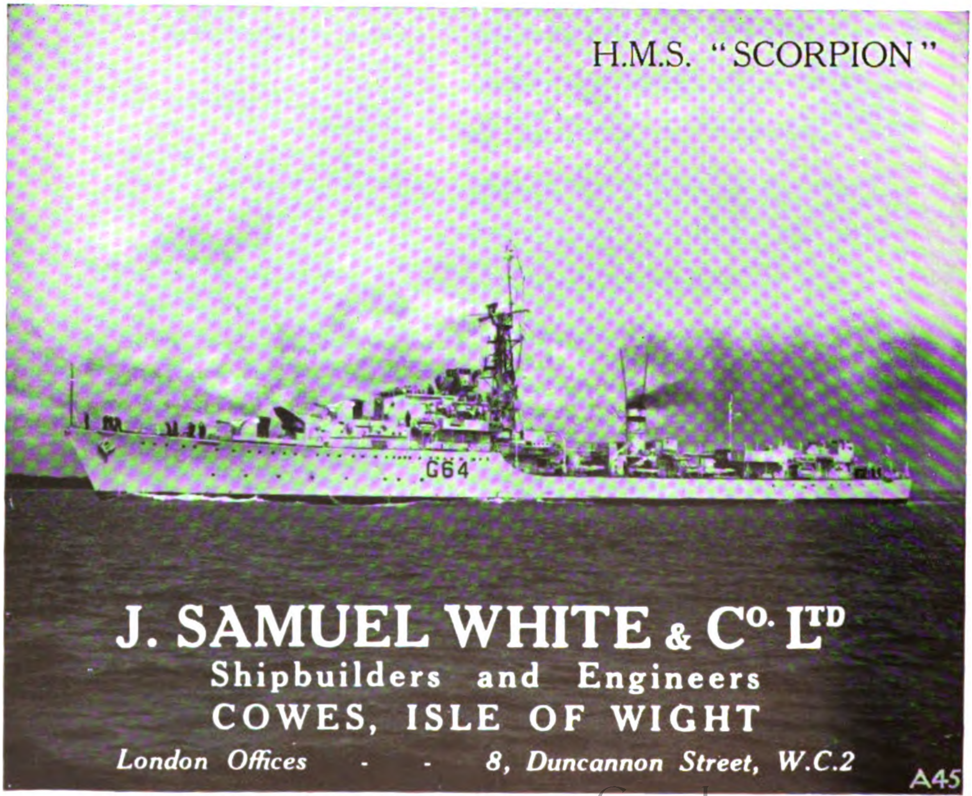

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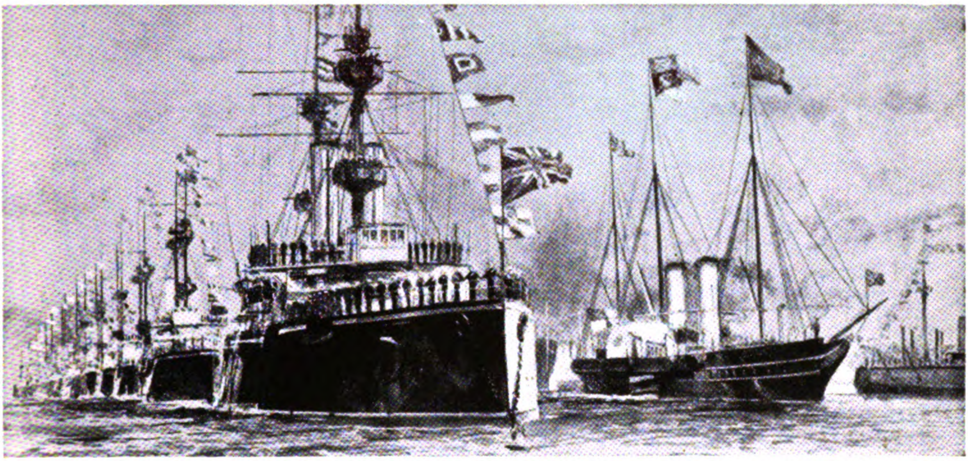

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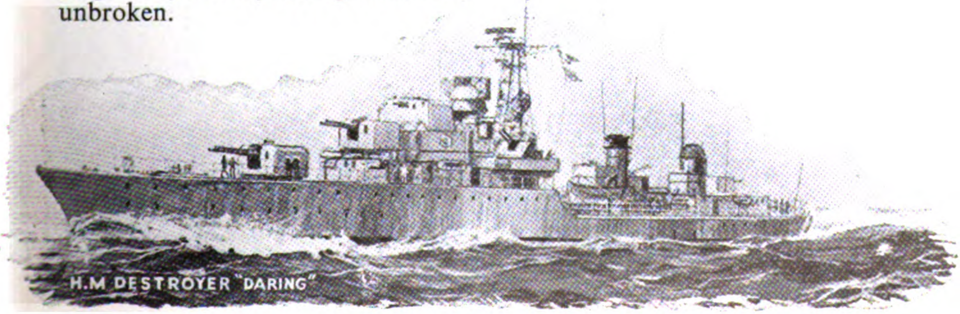
Less than a year after the Naval Review celebrating Queen Victoria's Diamond Jubilee, *H.M.S. SHELDRAKE* was refitted at Chatham. She was a torpedo-gunboat of 735 tons displacement and the purpose of her refit was to replace her locomotive-type boilers by water-tube units manufactured by Babcock & Wilcox; for "The Battle of the Boilers", between the supporters of the cylindrical and various water-tube types, was at its height. The tests carried out with "Sheldrake" and her larger sisters *Hermes* and *Espiegle* were a decisive factor in the report of the Admiralty Committee on Boilers, issued in 1904, which was to lead to the adoption of Babcock boilers for a long and impressive line of naval vessels, many of whose names have resounded in the Nation's history.

In the post-war years Babcock boilers have been specified for the new building programme of the Royal Navy, including such outstanding recent vessels as *Daring*, *Delight*, *Diana* and *Decoy* and for all the newest anti-submarine frigates.

The Boiler plant of *Sheldrake* and of all these new vessels shares a common ancestry. The link between the Royal Navy and Babcock & Wilcox, forged fifty-seven years ago remains unbroken.

BY STEAM

BABCOCK
Marine
BOILERS



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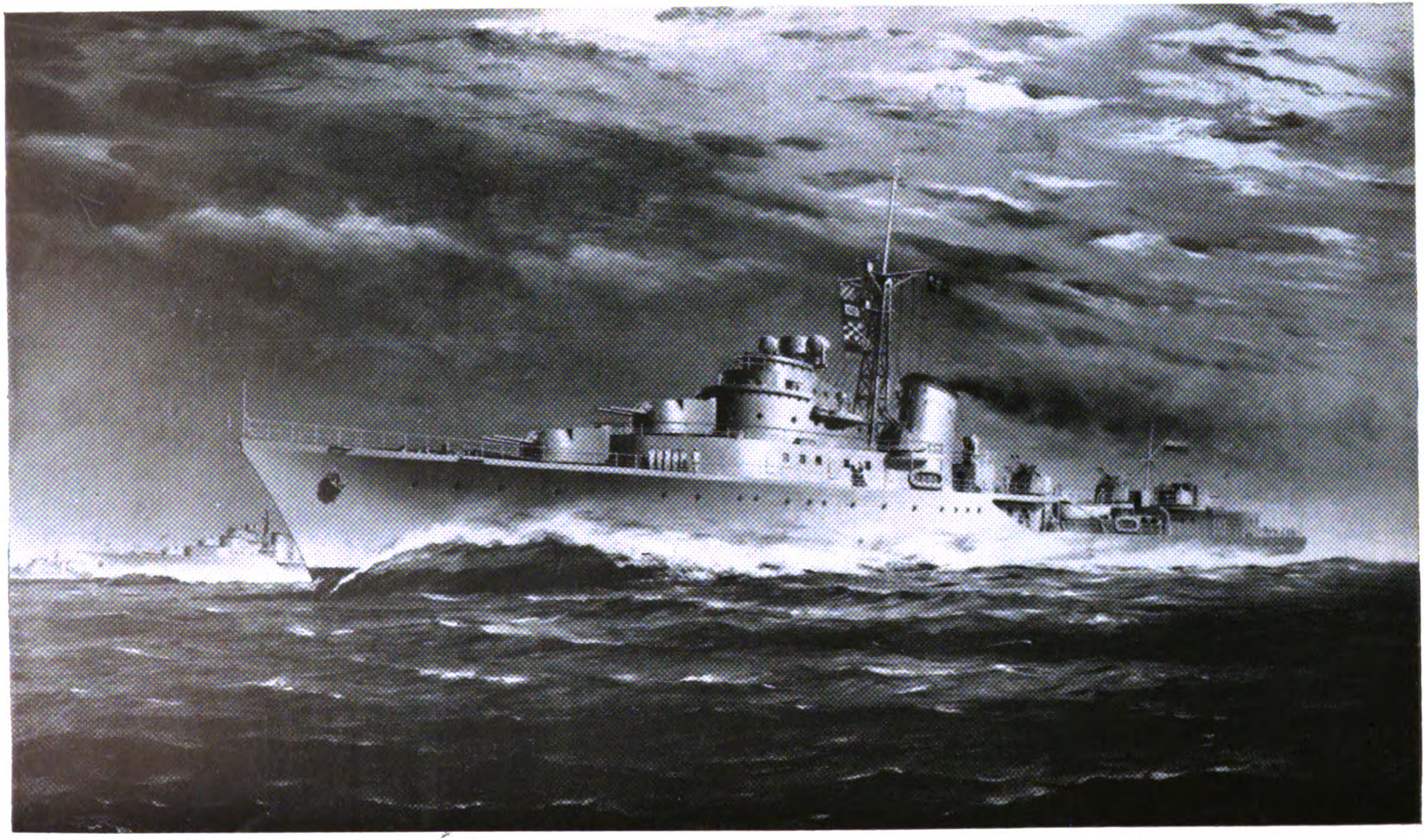

The Nueva Esparta is the first of three destroyers built for the Venezuelan Navy by Vickers-Armstrongs Limited at their Barrow shipyard

BRASSEY'S ANNUAL

THE ARMED FORCES YEAR-BOOK

1954

Edited by

REAR-ADMIRAL H. G. THURSFIELD

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CONTENTS

PAGE

Preface ix

CHAPTER I

The Defence Team .. .. *The Editor* 1

CHAPTER II

The Services in 1953–54
Major-General D. A. L. Wade, C.B., O.B.E., M.C. 7

CHAPTER III

The Role of the Royal Navy
A Speech by Admiral the Rt. Hon. the Earl Mountbatten of Burma, K.G., G.C.S.I., G.C.I.E., G.C.V.O,, K.C.B., D.S.O 29

CHAPTER IV

The Role of Modern Infantry in Battle
General Sir Harold E. Franklyn, K.C.B., D.S.O., M.C. 35

CHAPTER V

The Role of the Bomber
Wing-Commander C. N. Foxley-Norris 49

CHAPTER VI

Soviet Policy and War .. .. .. *Jules Menken* 59

CHAPTER VII

The Naval Strength of Russia
Commander Anthony Courtney, R.N. 75

CHAPTER VIII

Communist Air Forces .. .. .. *Asher Lee, O.B.E.* 82

CHAPTER IX

Western Europe and the Problems of Mobile Defence
Colonel the Hon. E. H. Wyndham, M.C. 92

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CHAPTER X

HISTORY FOR OFFICERS OF THE FIGHTING FORCES PAGE
Captain Cyril Falls 99

CHAPTER XI

TOTAL WAR .. .. *J. M. Spaight, C.B., C.B.E., LL.D.* 111

CHAPTER XII

LESSONS OF THE KOREAN CAMPAIGN
Brigadier C. N. Barclay, C.B.E., D.S.O. 122

CHAPTER XIII

THE ROYAL AIR FORCE TODAY
Air Vice-Marshal W. M. Yool, C.B., C.B.E. 134

CHAPTER XIV

TYPES OF WARSHIPS .. *Rear-Admiral H. G. Thursfield* 141

CHAPTER XV

THE SERVICES IN PARLIAMENT .. *Ian Harvey, T.D., M.P.* 150

CHAPTER XVI

CANADA'S DEFENCE FORCES
Brigadier M. P. Bogert, C.B.E., D.S.O., C.D. 160

CHAPTER XVII

THE UNITED STATES AND THE "NEW LOOK"
Major the Hon. Alastair Buchan, M.B.E. 172

CHAPTER XVIII

AIR SUPPORT FOR THE ARMY
Major-General R. H. Bower, C.B., C.B.E. 180

CHAPTER XIX

AIR POWER AND THE LAND BATTLE .. *E. Colston Shepherd* 189

CHAPTER XX

THE ARMY'S SUPPLY PROBLEM
Major-General B. T. Wilson, C.B., D.S.O. 198

CHAPTER XXI

GLIDING AND ITS POSSIBLE VALUE TO AN AIR FORCE PAGE
Philip Wills, C.B.E. 205

CHAPTER XXII

COMPULSORY SERVICE IN THE ARMED FORCES
Major F. L. Lee, M.C. 212

CHAPTER XXIII

ENTRY AND TRAINING OF NAVAL OFFICERS
Rear-Admiral H. G. Thursfield 225

CHAPTER XXIV

THE POTENTIALITIES OF GUIDED MISSILES
Rear-Admiral Angus Nicholl, C.B., C.B.E., D.S.O. 234

CHAPTER XXV

THE WAR IN INDO-CHINA
Lieutenant-General H. G. Martin, C.B. D.S.O., O.B.E.
(Military Correspondent, "The Daily Telegraph") 241

CHAPTER XXVI

FOREIGN NAVIES .. .. *"Spindrift"* 255

CHAPTER XXVII

THE TANK AND ITS ANTIDOTES
Major-General L. O. Lyne, C.B., D.S.O. 275

CHAPTER XXVIII

PRINCIPAL INTERNATIONAL MARITIME EXERCISES IN 1953
Rear-Admiral H. E. Horan, C.B., D.S.C. 285

CHAPTER XXIX

NIGHT FIGHTING IN LAND WARFARE *Major H. B. C. Watkins* 293

CHAPTER XXX

TRAINING IN THE ROYAL AIR FORCE
Wing-Commander J. A. Holmes, D.F.C. 306

CHAPTER XXXI

THE DISPOSITION OF BRITISH SEA FORCES PAGE
Rear-Admiral H. G. Thursfield 320

CHAPTER XXXII

ANTI-TERRORIST OPERATIONS IN MALAYA, 1953–54
Brigadier K. R. Brazier-Creagh, C.B.E., D.S.O. 327

CHAPTER XXXIII

AIRCRAFT DEVELOPMENT
Group-Captain G. W. Williamson, O.B.E., M.C. 340

CHAPTER XXXIV

ENGINEERING FACTORS AFFECTING NAVAL OPERATIONS
Commander (E.) A. Funge Smith, R.N. 365

REFERENCE SECTION

STATEMENT ON DEFENCE, 1954 373
NAVY ESTIMATES 398
ARMY ESTIMATES 412
AIR ESTIMATES 440
SERVICE EMOLUMENTS 452
RETIRED PAY AND PENSIONS 459
THE NORTH ATLANTIC TREATY ORGANISATION 470
N.A.T.O. GLOSSARY 478

LIST OF ILLUSTRATIONS

The Queen's Birthday, 1953. Her Majesty Queen Elizabeth II riding to the Ceremony of Trooping the Colour .. TO FACE PAGE 1
The Royal Homecoming.. .. .. ,, ,, 32
Vickers Valiant .. .. ,, ,, 48
The First Atomic Shell .. .. ,, ,, 64
Supermarine Swift IV .. .. ,, ,, 80
A Parachute Drop .. .. ,, ,, 96
Douglas X-3 .. .. ,, ,, 112
U.N. Commanders in Korea .. .. ,, ,, 128
H.M.S. Scorpion .. .. ,, ,, 144
North American F-100 Super-Sabre .. .. .. ,, ,, 160
The First Atomic Submarine .. .. ,, ,, 176
Helicopter Ambulance .. .. ,, ,, 192
Champion Glider .. .. ,, ,, 208
A Suez Canal Post .. .. ,, ,, 224
Police Work in Kenya .. .. ,, ,, 240
Re-fuelling at Sea .. .. ,, ,, 254
Gloster Javelin GA.5 .. .. ,, ,, 270
Sea Exercises .. .. ,, ,, 286
Handley Page Victor .. .. ,, ,, 302
H.M.S. Eagle .. .. ,, ,, 318
Malayan Jungle Operations .. .. ,, ,, 334
Consolidated Vultee XFY-1 .. .. ,, ,, 350
Exercise Mariner .. .. ,, ,, 366

PREFACE

THE AIM and policy of the editorial staff of "Brassey's Annual"—Brigadier C. N. Barclay, Air Vice-Marshal W. M. Yool and myself—remain as in former years to present, to readers who are interested in Defence Policy and problems, a balanced review year by year of the development and of the material progress of the three Services, so far as the relevant details of the latter have been made public. Readers of former issues of this Annual will note that the division of the contents into separate sections devoted each to one of the Services no longer obtains, though the proportion devoted to the various aspects of the subject of Defence is unchanged. The division seems no longer appropriate inasmuch as we have throughout treated the separate Services as equal members of the Defence Team, and have endeavoured to make the contents equally valuable to all readers, even though they may be especially interested in one of the Services rather than the others.

Once again, as in all recent years, those features of the international situation upon which most defence and strategical problems depend have been in a state of flux throughout the period this volume has been in preparation. Moreover, since an annual must necessarily be prepared some months in advance of publication, several more developments in this sphere will probably have occurred before the volume is in the hands of the public. For example, since Lieutenant-General Martin's informed survey in Chapter XXV of the war in Indo-China was written, a cease-fire has been arranged in that strife-torn country and is in the process of being brought gradually into force as this Preface goes to press. Simultaneously, the inexcusable outrages by communist Chinese aircraft over the high seas off Hainan have produced an atmosphere of tension of which the outcome cannot yet be foreseen; though the signature at the same moment of an Anglo-Egyptian outline agreement on the vexed question of the Canal Zone should contribute materially to the easing of tension in the Near East. It is to some extent the same thing in the administrative sphere. Early in the year the Admiralty announced the adoption of a new system in the immensely important matter of the entry and training of naval officers; but some of the minor detailed arrangements were not decided and published until after Chapter XXIII on the subject was in the press. Such late developments, however, do not affect the validity of the surveys of progress, or the discussions of Defence problems, which we offer to our readers; they are those of the year as a whole rather than of the last few weeks.

H. G. T.

BRASSEY'S ANNUAL
THE ARMED FORCES YEAR-BOOK

(*Central Office of Information*)

London, 1953. For the first time in history a reigning British Queen took part in the traditional ceremony of Trooping the Colour.

Her Majesty Queen Elizabeth II, wearing the uniform of the Scots Guards and escorted by a Sovereign's escort of the Household Cavalry, riding from Buckingham Palace to Horse Guards Parade

CHAPTER I

THE DEFENCE TEAM

By the Editor

Four years ago, when the scope of "Brassey's Naval Annual," as it then was, was enlarged to serve the interests of all three Services instead of that of the Navy alone, and it became "Brassey's Annual, The Armed Forces' Year Book," the chief intention of the change was defined in the words, "the keynote throughout will be emphasis on the essential unity of the three Services as members of the nation's defence team." I make no apology for returning to this theme in the current number, for there have been signs of late that this great lesson which emerged from the experience of the late war is today in danger of being forgotten, or at least ignored, in more than one quarter. That, perhaps, is the common fate of war experiences—it has often been said that the lessons learnt through bitter experience in wars of the past have to be learned again in every new war. Certainly the saying has often proved only too true of this particular lesson, for although there have been in our history innumerable instances of whole-hearted and very effectual collaboration between the Services in the course of nearly every war in which this country has been engaged, once the stimulus of common action against an enemy has been removed, those Services have tended to retire into their own spheres of activity, in isolation from partners. That tendency is perhaps unavoidable to some extent, since preoccupation with their own highly skilled and absorbing activities, in all three Services, may well obscure any less pressing matters in many minds; but if that is so, it is all the more important to guard against it.

It should be said at once that this great necessity has been well recognised in the Services themselves. The establishment of the Imperial Defence College, the Joint Staff College, the Joint Anti-Submarine School—the Army does not come into the last-named, except in the sense that it is responsible for the defence of any vital point against attack by land—and other joint training establishments provide evidence that the Service Staffs are fully aware of the need for fostering inter-Service collaboration. Moreover, all who have had first-hand acquaintance with those establishments, or with any other spheres in which the Services have occasion to work together, have testified to the excellent spirit of co-operation that is manifested by them all. The inter-Service controversies of which signs have been manifest of late have not had their origin in the lower ranks of the Services themselves—or even, so far as the independent observer can detect—in serving officers of any rank so much as in political circles, and in those journalistic strategists who are always ready to teach the Services, and the Service staffs, their business.

For instance, in more than one widely-read newspaper of substantial influence, no opportunity seems to be lost of conveying, if not saying outright, that the senior officers of the older Services are "back numbers," unthinkingly mumbling the shibboleths of the past, and that intelligence and understanding of the present is to be found in the Royal Air Force alone. In the debate on the Navy Estimates in March of this year, an ex-minister remarked that the Navy's role was being increasingly "challenged" by the other Services. Some rather vociferous self-appointed strategists even go so far as to maintain, following the doctrines of Major Seversky, that the days of armies and navies are past, and that all their functions, so far as they survive at all, can be better discharged by air forces. Such pronouncements, so far as they express the principle that times and circumstances change and that practical men and methods must change with them, are perfectly legitimate; but when they take the form—as they too often have done in controversy that is either frankly political or, though veiled in a strategical setting, actually political in its aims—of denigrating one Service at the expense of another, and stirring up controversy, or even bad blood, between them, are wholly mischievous. None who dissuades the Services from examining, and frankly recognising, the changes in conditions that profoundly affect their functions and their methods are doing them any service; but those who make those changes an occasion for casting aspersions on men of great integrity and devotion to duty, and for stirring up discord between Services where the utmost harmony and collaboration are essential to the national safety, are not only doing no service to the country or anyone in it, but are doing active harm.

The great change that, at the moment, underlies the degree in which responsibilities are, or ought to be, shared between the Services is, of course, the great development of air forces; and the most important problem to which that change gives rise is, what duties or functions hitherto discharged by the Navy and Army, can be, or ought, on the ground that they can be more efficiently undertaken by air forces, to be transferred to the R.A.F. It is no easy problem to solve, for the advances in the air did not cease with the end of the late war, and the experience of that or any other war do not provide the full solution. But, it should not be forgotten—though it often is forgotten by inveterate controversialists—that neither can unproven theories of what the future will eventually bring forth, provide a reliable solution. Admiral Mahan, many years ago, reminded his readers that, in the evolution of fighting forces, it is just as possible to be too quick in discarding as to be too slow in adopting. Those extremists who argue that air forces are capable of doing all that navies and armies exist to do in war, and doing it more effectively, would have us fall into the first error; while those—if there be any—who ignore the growing power of air forces and refuse to recognise that there are combatant duties that ought to be transferred to them, are clearly slaves to the second. But Mahan's maxim has an even closer application to my theme than that. The experience of the late war no less than of every earlier war, in the history of our country as well as of every other, has been that harmony and collaboration between all forces of a nation at war are the essentials of victory; that is a principle which it can never be time to discard, whatever the new weapons and methods that demand adoption. Mischief makers, and particularly makers of mischief between the Armed Forces, can only be regarded as enemies of their country.

The arguments of those who would now, on the ground that aircraft can already sink any ship that floats, hold that warships are obsolete and that all their functions except, perhaps, minesweeping and a share in the attack on an enemy's submarines—should be transferred to air forces, hardly demand a reasoned answer; any more than those of the extremists who argue that since the coming of the atomic and the hydrogen bomb, which can be delivered by air forces, there is no need for the troops on the ground who form armies. Yet it may be worth while to subject them to some examination. The first seems to spring from some confusion between the end and the means; for the sinking of an enemy ship is the means by which sea power may be exerted, rather than the whole duty of sea forces.

In any war in which this country may be engaged, whether alone or as one member of a Grand Alliance such as the North Atlantic Treaty Organisation, it is clear that its very existence, let alone its power to wage war at all, depends upon its power to use the seas as a highway. The daily life of the country and of the industries upon which that life depends demand the weekly arrival of thousands upon thousands of tons of supplies from all parts of the world, which can only come by sea. The Armed Forces themselves are all unable to operate, even to move, without the arrival of a similar amount of fuel, which is not produced in this country but must all come from abroad; it can come only by sea. There is no prospect whatever of this immense volume of sea-borne supplies ever being able to come by air—any computation of the terminal facilities required for such a volume of air traffic shews that it would be quite impracticable ever to provide them in this country, even if it should eventually prove a practicable proposition to carry all the traffic itself through the air. These facts are so self-evident that I apologize for recapitulating them; but the conclusion from them is that the first necessity for this country in war is to ensure the constant flow of ships of burden throughout all the seas, and that an enemy's most certain method of reducing this country to submission would be to stop them, by destruction or any other effective means.

If an enemy finds an effective means of interrupting the flow of our sea communications, that interruption must of necessity be directly countered. It cannot be ignored while we pursue some other form of warfare designed to distract the enemy's attention from the sea affair; for as I have pointed out, if the supplies stop, so does our power to wage war at all. The task at sea is to keep the supplies moving, as well as the ships that bring them, the latter in both directions; and the most effective method of doing that—as in every other operation of war—is to destroy the enemy armed forces that are causing the interruption. The means to that end depend on the nature of the attack and the weapons, or forces, that the enemy of the day is using. Clearly air forces must have a great part in that task, not only because the enemy at the moment may be in the air and chiefly vulnerable in the air, but also because air forces have proved themselves capable, given the conditions that are favourable, of destroying any ship, however powerful. But unless they can prove themselves capable, in *all* conditions, of countering the attack that is holding up supplies, it would be disastrous to rely on them *solely* to do it.

The disability of air forces, for any sort of continuing operations, is that they cannot stay on the spot. They can strike a blow, many blows even, as long as their endurance and ammunition supplies last, but then must leave the scene to replenish. The maintenance of sea-borne supplies involves continuous attack on their enemy who may—like a submarine—be very difficult if not impossible to locate except when engaged in his attack. Within comparatively short range of their operational base, air forces are capable of providing this continuous escort; but the farther from that base it is needed by the ships under attack, the less efficient are land-based air forces for the task, since so much of their endurance must be devoted to getting to and from their base and scene of action. It may well be that aircraft of the present day can be endowed with endurance that will enable them to operate, for instance, anywhere in the Atlantic; indeed, there is no doubt about it. But it is hardly an efficient method of employing aircraft on the protection of shipping to do so in areas that involve their using as much of their fuel, if not more, in getting to and from the place where they are needed to go into action, as they can afford to use when in contact with an enemy, when it is possible, by collaboration between ships and aircraft, to provide them continuously on the spot. More than twice as many aircraft will need to be employed from a distant land base than ship-borne aircraft on the spot; and the former need far more men to man them than the latter, being much larger craft. The argument from man-power cannot, of course, be pushed too far, since to those who fly her aircraft must be added those who man the carrier that enables them to be at all times available where they are wanted. But the ship can be employed in other duties as well—as, for instance, where the "M.A.C." ships that rendered such valuable service to the Atlantic convoys in the late war—so that it is not sound to debit the whole of the man-power they absorb to the task of defence of sea-borne supplies. The crux of this argument is the conclusion that collaboration between sea and air forces in this most essential sphere of defence is both more effective and more economical of force—and of fuel, the life-blood of operations—than reliance solely on one or the other.

To the disability that land-based air forces are gravely handicapped in providing defence for the slow-moving ships that carry the country's essential supplies must be added that of their being quite unable to provide that defence at all in far distant seas. Yet sea-borne supplies are liable to attack there, no less than close to their destination in this country. In such areas, as was demonstrated in one of the articles in last year's issue of "Brassey's Annual," defence can be provided only by a combination of sea and air forces. There is no possibility of dispensing, in the vital sphere of the maintenance of sea-borne supplies, with the necessity for the intimate and constant collaboration of sea and air forces.

Moreover, an examination of the methods most likely to be used by an enemy to attack sea communications leads to the same conclusion. Against enemy submarines, all experience goes to shew that the most effective force is that formed of ships and aircraft in collaboration. Against a submarine on the surface, aircraft attack may be deadly; but once the submarine submerges, the aircraft has no means of keeping in touch with her and must abandon the chase until the enemy chooses to return to the surface. A ship, on the other hand, though she can rarely get the opportunities that an aircraft does of sighting an enemy submarine on the surface, can locate her submerged, and can often keep in touch with her below the surface and hunt her relentlessly for hours. Each arm, in fact, supplies the deficiencies of the other, and the combination of the two provides a far greater measure of effective defence than either alone. That is why all maritime powers are straining every nerve to produce the submarine which—being propelled by atomic power or some form of engine that leaves no visible trial on the surface of the sea, yet is not so limited in endurance as the electric battery—does not need to surface at all and so expose itself to the observation and attack of aircraft. If such a submarine is produced—it has been stated that no navy has yet succeeded in completing one—it will still be liable to location when submerged by the Asdics, or later detecting apparatus fitted in surface ships; but the surface ships' disability will be the difficulty in getting into effective range. Here again is where collaboration of aircraft will become so valuable; for the aircraft, unable herself to locate the submerged submarine, can be guided and controlled from the ship which can remain in touch.

If the attack on shipping comes from the air, there are two methods by which is can be countered—fighter aircraft escort, or anti-aircraft fire—in which today must be included guided missiles—from escort ships or again from escorting air forces. Fighter escort can only be provided by land-based aircraft within a comparatively short range of the home land or allied territory; and the zone in which that fighter escort is available covers only a very small proportion of the whole voyage of the supply ships needing defence. Outside that zone, again it demands ship-borne aircraft. As regards anti-aircraft weapons, the A.A. gun can only be carried in a ship. The potentialities of the guided missile as an A.A. weapon are not yet known outside official circles, and it is not possible for anyone else to pronounce how ship-borne forms of that new device compare with those that can be carried and used from the air; but it must be clear that aircraft can carry only a few of them compared with those that a ship can provide. Clearly ships employed on the escort and defence of sea-borne traffic against air attack cannot dispense with the collaboration of aircraft; but equally clearly neither can air forces undertake that duty alone, without the collaboration of warships. Defence depends on the team, not on one member of it to the exclusion of others. The analysis need not be pushed further, for every line of examination leads to the same conclusion.

If we turn to the relations between land and air forces, it emerges once more. It has even been argued that the appearance of the nuclear bombs has made armies unnecessary, that obliteration of an enemy's cities, industrial resources or territory that they are capable of producing will bring victory without the necessity for fighting on the ground. It is necessary to point out that this theory is completely unproven, and indeed there is much to show that it is erroneous. No nuclear bombs, it is true, were used against Germany in the late war, but the actual devastation wrought by the "conventional" bombs that were showered on her in six years amounted to as much as if the newer weapons had been available a little earlier. Yet Germany was not induced to surrender until the Allies had occupied the whole country. Japan, it is also true, did actually surrender after two atomic bombs had been dropped on two of her cities; but she was already a defeated nation by that time, and her fuel supplies at home were reduced to some ten days supply of what she would have needed in resisting the invasion of her home-land which was known to be impending. Ten days after that invasion had been launched, all her forces would have been immobilized and surrender must have come then (see Rear-Admiral Toshiyuki Yokoi in a recent number of the U.S. Naval Institute Proceedings). The atom bombs provided the face-saving reason for surrender which Japanese mentality demanded; and their moral influence then cannot be put higher than that.

There is nothing today to invalidate the wise dictum of Sir Walter Raleigh in his official history of "The War in the Air, 1914–19."

> A country that is conquered must be controlled and administered; a city that surrenders must be occupied. Battles can be won in the air or on the sea, and the mark of victory is this; that the patient infantry, military or civil, can then advance to organize peace.

No army, any more than any fleet, can dispense with the essential collaboration of air forces in the operations in which the conduct of war involves them; but neither can air forces dispense with the collaboration of armies to secure the bases from which they must work if they are to deliver the blows—atomic or otherwise—which are in their power alone, or to "organize peace," in Sir Walter Raleigh's words, when the victory is won. The strength of all three Services in war lies in their membership of the Defence Team; and those who deny or ignore that well-proved principle, and attempt to stir up jealousy or controversy between them, are doing no good service to their country.

H. G. T.

CHAPTER II

THE SERVICES IN 1953-54—A SURVEY

By Major-General D. A. L. Wade

The Coronation of Her Majesty Queen Elizabeth II on June 2, 1953, provided an unique occasion for many millions of people throughout the British Commonwealth and in foreign countries to gain through the medium of the film and television some impression of the extent and variety of the Armed Forces of the Commonwealth. Close on 30,000 men and women of the three Services took part in the Coronation parade. Of these some 2,000 were drawn from the overseas nations and 500 from the Colonial territories. As far as possible representative detachments of regular and reserve Services and units were included in the parade. The heavy rain which fell during the procession from the Abbey did little to mar the splendour of the occasion or to damp the enthusiasm of the vast crowds assembled in London. At Spithead on June 15 Her Majesty reviewed over 200 ships of the Royal Navy, of the Royal Fleet Auxiliaries, Merchant Navy, Fishing Fleets, and of the Navies of Australia, Canada, Ceylon, India, Pakistan, and New Zealand. Warships from sixteen foreign countries were also present. A month later Her Majesty reviewed the Royal Air Force at Odiham, Hants, where over 600 aircraft took part in the fly-past.

The past year marked the opening of what the Prime Minister has so aptly termed "the prolonged pull" in our defence programme. The strength of the Active Forces remained at an even level of just under 860,000, whilst the Reserves increased by some 40,000. (Detailed figures are given in "The Statement on Defence, 1954," see page 373.) The emphasis has been on the design and production of new weapons and equipment. In August the Minister of Supply gave some indication of the progress made in the guided missile field. He disclosed that we had overcome the problem of ground-to-air rockets capable of speeds of over 2,000 miles per hour and able to engage aircraft at heights over 50,000 feet. Successful tests of these weapons had been carried out at Woomera in Australia. In addition he indicated that "an advanced stage" had been reached in the design of guided rockets to be launched from fighter aircraft. In October the second and third British atomic explosions were successfully carried out at Woomera. No details of these tests were released, but it has recently been announced that atomic weapons are in production and that "delivery to the forces has begun."

Recently H.M.S. Explorer, a submarine designed for hydrogen-peroxide propulsion, was launched, and nuclear propulsion has reached a stage where practical application may be expected in the near future.

The Army's new infantry anti-tank gun, the "Bat," is now in production. It is a 120-mm. recoil-less gun weighing just under one ton. Being less than four feet high it is easily concealed. A new heavy tank, developed from the Centurion medium tank, is now undergoing field trials, and a new light anti-aircraft gun—to replace the Bofors—has been introduced.

Delivery of modern fighter and medium bomber aircraft to the R.A.F. has been further delayed by "teething" troubles in the flight testing stage. However, the first "Swifts" have been delivered to Fighter Command, and the first production model of the "Valiant" bomber has recently started flying tests. It is anticipated that deliveries of this aircraft and the "Hunter" fighter will commence in the coming year. In naval aviation the re-equipment programme has at last got into its stride and during the past year several squadrons received "Sea Hawks" and one squadron "Wyverns."

On July 27, 1953, an armistice was signed in Korea. Fighting ceased at 10 p.m. local time. Front line defences were dismantled and the troops of both sides withdrew to a distance of 2 kilometres on either side of an agreed line by the evening of July 30. There the armies remain on guard pending a settlement of peace terms. British casualties during the three years of war amounted to just over 7,000 killed, wounded, and missing.

Despite the cease-fire in Korea the tasks of the Services have remained as heavy as ever. The main burden still falls on the Army. Some 80 per cent of the Active Army remains overseas and there is still no strategic reserve at home. Although the situation in Malaya has improved, the position in Indo-China has deteriorated and South-East Asia remains a danger point. It has not, therefore, been found possible to withdraw any of our forces from that area. In Egypt the political situation has shown no signs of improvement, and the withdrawal of our forces from the Canal Zone still awaits a settlement of the vexed question of the protection and maintenance of the base.

During the latter half of 1953 the increasing activities of the Mau-Mau terrorists in Kenya necessitated the despatch of an additional brigade headquarters and three battalions to that area; whilst the threat of serious civil disorders in British Guiana in October absorbed another battalion from home. These last two movements more than counter-balanced the withdrawal of two battalions from Austria at the end of the year.

The building up of a strategic reserve at home, therefore, remains one of the most urgent and difficult tasks facing the Government in our defence programme. In the meantime the training of mobile columns formed from the personnel of static military establishments has continued in the United Kingdom. Exercises in anti-airborne invasion tactics have taken place in conjunction with the Home Guard. Unfortunately the strength of the latter remains weak in many areas. In some cases battalions have enrolled less than 50 out of an establishment of 300.

THE NORTH ATLANTIC TREATY ORGANISATION

(*See Reference Section*, p. 470)

During the past year progress has continued in the training, equipping, and integration of the forces of N.A.T.O. In Europe the programme of construction of common defence works and installations—described as "Infrastructure"—has made solid progress in the form of new airfields, bases, oil pipe-lines and storage, and telecommunication networks. Two fundamental weaknesses in the N.A.T.O. structure, however, remain. The failure to ratify the treaty to give effect to the European Defence

Community, under which Western Germany would be re-armed and her forces integrated into a common structure with the forces of Belgium, France, Holland, Luxemburg, and Italy, leaves a dangerous gap in the European defence curtain. The key to ratification lies with France, whose fears of a re-armed Germany are understandable. One can only hope that these fears may shortly be submerged in the common interests of the N.A.T.O. partners. For, so long as Germany remains unarmed, some half million men are required to fill this gap in the defence structure. The second fundamental weakness lies in the state of readiness of the reserve formations and units. General Gruenther referred to this problem in graphic terms in a recent speech in which he said "Our regular forces have the job of holding the enemy forces as much as possible. But they could not carry out the task alone, if the reserve units (the butcher, the baker, the candlestick maker from Lyons, from Courtrai or Canterbury) were unable to be mobilised, equipped and organised within a few days." At present the state of readiness of reserve formations and units is such that the time required to put them in the field can be measured in terms of a few months rather than a few days. Unless, therefore, the outbreak of war were preceded by a considerable period of increased international tension during which the timely decision to mobilise the reserve forces were taken, there appears no hope of meeting General Gruenther's requirement. Time is an essential weapon in war, and in the initial stage it lies in the hands of the aggressor. The task of N.A.T.O. is essentially defensive. At present its main strength lies in its superiority in atomic weapons. The handling of these rests with the United States Strategic Air Force. In the near future R.A.F. Bomber Command will be similarly equipped. The essential task of the N.A.T.O. forces is to act as a shield to guard the air bases and to keep open the sea and air routes to Europe. This shield is as yet dangerously weak.

On July 11, 1953, General Alfred M. Gruenther, U.S.A., succeeded General Matthew B. Ridgway, U.S.A., as Supreme Allied Commander, Europe (SACEUR). At the same time Lieut.-General Gortland Van R. Schuyler succeeded General Gruenther as Chief of Staff, S.H.A.P.E.

On August 19 the command structure in Central Europe was changed. Previously SACEUR had retained direct command of the forces in this area in his own hands. Under the re-organisation Marshal Juin (France) was appointed to the new post of C.-in-C., Allied Forces, Central Europe with the subordinate naval, land and air commanders under him. General M. M. Carpentier (France) succeeded Marshal Juin as C.-in-C., Allied Land Forces, Central Europe. Vice-Admiral Jaujard (France) remained C.-in-C., Allied Naval Forces, Central Europe. Air Chief Marshal Sir Basil Embry, R.A.F., succeeded General Lauris Norstadt, U.S.A.F., as C.-in-C., Allied Air Forces, Central Europe. General Norstadt was appointed Air Deputy to SACEUR Vice-Air Chief Marshal Sir Hugh Saunders, R.A.F. The latter appointment now carries the additional responsibility of operational control of air forces not allocated to specific subordinate commands, e.g. strategic air forces. In the Northern European Command General Sir Robert Mansergh (Britain) succeeded Admiral Sir Patrick Brind, R.N., as C.-in-C., Allied Forces on April 1, 1954. In Southern Europe Admiral William Fechteler, U.S.N., succeeded Admiral Carney, U.S.N., as C.-in-C., Allied Forces on August 20, and on October 14 a new 6th Allied Tactical Air Force with Headquarters at Izmir, Turkey, came into being with the main task of supporting Allied Land Forces, South-East Europe covering Greece and Turkey. Major-General Eaton, U.S.A.F., is the commander of this new air formation. Recently it was announced that the Supreme Command, North Atlantic, would pass from Admiral Lynde McCormick, U.S.N., to Admiral Jerauld Wright, U.S.N.

Two major exercises involving N.A.T.O. naval and air forces were carried out in September–October: Exercise "Mariner" in the Atlantic and Northern European areas and Exercise "Holdfast" in the Mediterranean and Southern European areas. These and other N.A.T.O. exercises are discussed in Chapter XXIX. The principal exercises on land were "Grand Repulse" in September involving some 60,000 British, Danish, Dutch, and Canadian troops of General Sir Richard Gale's Northern Army Group of Allied Forces, Central Europe, together with No. 2 Group, R.A.F. and allied air forces; and an air defence exercise "Heads Up" in Norway and Denmark also during September in which the R.A.F., R.C.A.F., U.S.A.F., Danish and Norwegian Air Forces took part. In the former exercise a special study of atomic targets was carried out, and in the latter the Civil Defence units and Home Guards of Norway were employed over the week-end in conjunction with the anti-aircraft defences.

DEFENCE ESTIMATES 1954–55

In the "Statement of Defence, 1954" (see page 373) reference is made for the first time to atomic weapons. The probable nature of a global war is forecast, with an initial period of atomic attacks by both sides lasting for a relatively short time but inflicting great destruction and damage. If no decisive result is reached in this period, a period of "broken-backed" warfare is likely to ensue in which the opposing nations would seek to recover their strength in the hopes, presumably, of inflicting their will on their opponents by destroying their forces and/or breaking the morale of their population. Our defence policy is, therefore, to be based on the prime necessity of the prevention of war, by maintaining our land in technical developments to offset the preponderance of the Communist States in man-power. The Air Force has the major deterent role, and for this purpose it is aimed to build up a powerful force of medium-bombers armed with atomic weapons. The Navy will continue to build up its anti-submarine and anti-mine forces and complete the aircraft carriers now under construction. Within the limits imposed by its N.A.T.O. and overseas commitments it is aimed to reduce slightly the front-line formations of the Active Army, and at the same time to build up a strategic reserve at home. At the same time re-equipment of the Active Army and of those Territorial divisions which would be the first to be mobilised for active service, is to continue.

The implication of increased air power and reduced land power is not, however, reflected in the detailed estimates for the Services in 1954–55. The amounts allotted to each Service show little variation from the last year. The detailed estimates of expenditure for defence in 1954–55 show a total of £1,639,900,000 (£1,636,760,000), from which must be deducted the figure of £85,360,000 (£140,000,000) promised in aid by the United

States, giving a net figure of £1,554,540,000 (£1,496,760,000). Figures in brackets denote corresponding estimates for 1953–54. An examination of the main headings of expenditure shows that for the Navy about £209,000,000 (£185,000,000) is required for ship-building, repairs, maintenance, and armaments. For the Army about £150,000,000 (£165,000,000) is required for warlike stores, and for the Air Force £156,000,000 (£140,000,000) is earmarked for aircraft. The Ministry of Defence estimates include a sum of £18,500,000 (£13,500,000), being the United States share in the N.A.T.O. infra-structure programme. The increased emphasis on research and development is reflected in the Ministry of Supply estimates at £150,000,000 (£124,000,000).

MANPOWER

The strength of the Active (i.e. full-time) Forces on April 1, 1953, was 871,100. In addition the Reserve and Auxiliary Forces comprised some 427,000 (figures for January 1, 1953). The estimated strength of the Active Forces on April 1, 1954, was 855,500. The official strength of the Reserve and Auxiliary Forces on January 1, 1954, was 571,000. The increase shown by this latter figure was due to the flow of national service men who on completion of their period of two years' colour service passed into the reserve for three and a half years part-time service under the National Service Acts 1948–50. Some of these men will shortly have completed their periods of service under these Acts, so that similar increases are not likely to be recorded in the future. These latter will—under the Navy, Army and Air Force Reserves Act, 1954—still be liable, until June 30, 1959, for recall in the event of emergency. Under the same Act men who served in the forces between September, 1939, and December, 1948, are with certain exceptions now liable for recall up to the age of 45 or until June 30, 1959, whichever is the earlier.

The male regular strength of the Services has remained fairly constant at about 530,000 throughout the past year. By April 1, 1954, all those who were either recalled or compulsorily retained as the result of the Korean emergency will have been released. In all three Services regular recruiting declined during the past year by about 20,000. This decline is not expected to continue in the coming year, since the majority of recruits for the Army and R.A.F. come from men otherwise due for call-up for national service, and the number of these was smaller than in the previous year. At first sight, therefore, the position as regards regular personnel might appear reasonably satisfactory. Unfortunately this is far from being the case. In the Navy large numbers of ratings who entered on seven-year engagements soon after the war are now becoming due for release. The present indications are that not many of these men will decide to stay on in the Service. In the Army and R.A.F. the majority of recruits are now on an initial three-year engagement. Here again the indications are that nothing like the necessary proportion of these men will re-engage at the end of their three years. As things stand at present, therefore, all three Services are faced with a prospective serious shortage of men with sufficient experience and training to provide N.C.O's. and skilled technicians. As recorded later in this chapter the Government have recently decided to introduce certain measures to improve conditions of service and pay with the object of inducing more men to prolong their service. In the Navy and Air Force Reserves the number of volunteers has remained at a fairly constant level throughout 1953. In the Army Emergency Reserve the marked increase in volunteers noted in 1952 has not been maintained at the same level, but nevertheless there has been an increase by about 15 per cent. On the other hand the number of volunteers in the Territorial Army has continued to decline. Fortunately the number of national service volunteers in the T.A. now amounts to about 30 per cent of those passing into that force, whilst the national service volunteer element in the other Reserve and Auxiliary Forces has shown a substantial increase.

There have been no appreciable changes in the overall strength of the Women's Regular or Reserve Forces.

BRITISH FORCES IN KOREA

In April, 1953, the British Commonwealth Division, after two months in reserve during which intensive training was carried out, returned to the line in the River Imjin Sector. During that period the divisional artillery were not withdrawn but remained in action in support of American troops. In the meantime the Division had received a reinforcement of about 1,000 South Korean troops under the policy of integrating a proportion of Koreans into United Nations units. These troops are commonly referred to as "Katcoms." During the protracted negotiations which led up to the signing of the Armistice on July 27, 1953, heavy fighting took place, the Communists forces launching repeated attacks mainly on the East and East-central sectors. Apart from heavy fighting on May 3 and 8 and a determined attack by Chinese troops against the "Hook" on May 29 which was repulsed by the Duke of Wellington's Regiment, the Commonwealth Division was not engaged in any major actions. Intense patrol activity, however, continued to the end. On April 20 an exchange of sick and wounded prisoners of war commenced. During the next few days 32 British were handed over by the Communists.

Under the terms of the Armistice repatriation of prisoners of war started on August 5, and was completed on September 6. The number of British involved was 43 officers and 903 other ranks. Since the Armistice the Commonwealth Division has remained intact. Its tasks have been threefold—guarding and policing the demilitarised zone, preparation of a defence position from which to fight should hostilities be resumed, and training. During the two years it was engaged in action total casualties amounted to just over 4,500, of whom 865 were killed or died and 97 missing believed killed. Whatever the future of the division may be it has assuredly played a most distinguished part in the Korean War and has inscribed its name in military history.

Although the Korean War was primarily fought on land and in the air, it has proved once again the inter-dependence of all three Services. Owing to the geographical circumstances of the Korean peninsular, the Commonwealth Navies, represented by the Royal Navy and the Royal Navies of Australia, Canada, and New Zealand, have throughout been able to afford the closest cooperation and support to the land-based forces. Their main tasks—operating on the West Coast—have been to deny the enemy movement by sea, to guard the numerous islands right up to the mouth of the Yalu as bases for guerrilla operations and radar stations, and to support the land forces by air strikes and bombardment. In pursuance of these tasks some 74 warships and ships of the Royal Fleet Auxiliary Service saw service during the three years of fighting.

THE OPERATIONS IN MALAYA AND KENYA

The operations in these two countries have two points in common. They are essentially police actions in which the main objectives of the enemy are to disrupt law and order by attacks against the civil population; and the difficulties of engaging the enemy are greatly magnified by their ability to take refuge in the jungles and forests on some occasions and on others to appear amongst the population in the guise of peaceful citizens. In both countries military action has a twofold aim. Firstly, to force the terrorists to emerge from the forests to seek food. Secondly, to raise the morale of the peoples and obtain their aid in identifying and engaging the terrorists when they so emerge. In both countries the Governments are faced with political problems inherent in multi-racial communities striving for political autonomy but by no means united in their efforts or methods to attain that end. There is, however, one big difference. In Malaya the terrorists are Communist inspired and led. In Kenya the Mau Mau Secret Society is self-inspired and there is no evidence of outside influence behind it.

During the past year the military situation in Malaya has further improved. Evidence of this improvement is reflected in the following figures for 1953 compared with 1952 (in brackets): monthly average of Communists killed, captured or surrendered 124 (110); monthly average of civilians killed, wounded or missing 12 (over 50); monthly average of casualties in the Security Forces 18 (56). In 1953 there were 1,100 incidents resulting from Communist action, as compared with 3,700 in the previous year. On the other hand it has been officially stated that a hard core of Communist remains to control the movement and to enlist and train the rank and file, whose numbers probably amount to some 5,000. A further encouraging sign is the increasing number of Communists who are surrendering. A bold experiment has been made with some of these men who have on a voluntary basis been organised into a special force to fight against their former comrades.

Despite the steady progress made there appears no prospect of an early end to the emergency which is now in its sixth year. To eliminate the leaders of the Communist forces demands great patience, skill and endurance on the part of the security forces. The Army's contribution to these forces still amounts to 21 battalions (6 British, 7 Gurkha, 6 Malay, 1 K.A.R., 1 Fijian, and the Sarawak Rangers), and 2 Armoured Car Regiments together with supporting arms and services. Ships and motor launches of the Royal Navy patrol the coasts of Malaya. Several squadrons of the R.A.F. and R.A.A.F. and an R.E. helicopter squadron are continually employed in support of the ground forces by bombing, air lifting, air dropping, and voicing (i.e. delivering propaganda by loud-speaker). During the past year progress has been made in building up the Federation Army. The Headquarters, 1st Federal Division is now controlling operations in the Northern area and a 7th Battalion Malay Regiment has formed. The Federation Armoured Car Squadron and an Engineer been Squadron are in being. A military College for officer cadets and boys has been opened at Port Dickson. There is no shortage of Malay recruits, but the response from the Chinese has so far been disappointing.

Although a state of emergency was declared in Kenya in October, 1952, it was not until some eight months later that the planning and control of operations by the Army and police was made the responsibility of one man. In June, 1953, East Africa was created a separate command. Lieutenant-General Sir George Erskine was appointed C.-in-C. with full responsibility for planning and carrying out operations with the cooperation of the civil power. They in turn undertook to meet his requirements in all operational matters.

By the end of the year the military force amounted to three infantry brigades (39th, 49th, and 70th) with five British battalions, five King's African Rifles battalions, the Kenya Regiment, two mobile columns of East African Armoured Cars and Artillery and a Royal Engineer Regiment.

In addition there was a squadron of Harvards and four Lincolns of the R.A.F. The main tasks of the forces are to seek out the Mau-Mau gangs in the forest, and to open communications into the forest, thus enabling police and Kikuyu Guard posts to be established there. These tactics have so far succeeded to the point where the gangs are now tending to split up into smaller parties who are forced to live on the edges of the forest, where their raids on the settled areas are meeting with increasing resistance from the police and Kikuyu Guards.

MINISTRY OF DEFENCE

IMPERIAL DEFENCE COLLEGE

On January 1, 1954, Air Chief Marshal Sir Arthur P. M. Saunders, K.C.G., K.B.E., succeeded General Sir Frank Simpson, G.B.E., K.C.B., D.S.O., A.D.C., as Commandant.

NEW RIFLE

On January 19, 1954, the Prime Minister announced in the House of Commons, that a decision had finally been reached regarding the new type of rifle to be issued to the Forces. The British pattern E.M.2 (·280 calibre) had been rejected in favour of the Belgian F.N. ·30 calibre. It had previously been announced by the Standing Group, N.A.T.O. that Belgium, Canada, France, the United Kingdom and United States had, after extensive tests, agreed to adopt as standard a new light-weight cartridge of ·30 calibre. This cartridge would be the standard S.A.A. for N.A.T.O. forces. The primary reasons for accepting the F.N. ·30 in preference to the E.M.2 were—as stated by Sir Winston Churchill—first, greater simplicity of design with consequent ease of manufacture and secondly, the prospect that it would be more likely to be adopted by other N.A.T.O. countries.

The characteristics of this new rifle are: weight (without magazine) 9·2 lbs.; length (without flash suppressor) 41·5 inches and firing speed automatic 650–700 rounds a minute and 60 aimed single shots a minute. A combined bayonet (with 6½-inch blade) and the flash suppressor and grenade projector can be attached.

SERVICES PAY

With effect from April 1, 1954, selective increases in the pay of Regular Officers and Other Ranks of the three Services have been granted. The details were published in a White Paper (Cmd. 9088) on March 2, 1954. The increases are designed to give "increased recognition to long service, skill and experience." (See page 452.)

OFFICERS' PENSIONS

The Government have at last, under heavy pressure from both inside and outside Parliament, decided to mitigate some of the most serious of the anomalies existing in the rates of retired pay (i.e. pensions) of officers of the Services. The decision will affect about 8,000 of those retired officers whose pensions were stabilised in 1935 at 9½ per cent below the 1919 rates. They will receive the 10 per cent increase previously granted (in 1944 and 1947) to those similarly placed whose pensions were under £400 a year.

In effect, therefore, all the surviving officers—some 16,500—whose pensions were stabilised in 1935 at 9½ per cent below the 1919 rates, will henceforth receive the 10 per cent increase. Details were published in a White Paper (Cmd. 9092) on March 2, 1954. (See page 459.)*

THE ROYAL NAVY

During the past year steady progress has been made in the design, construction, and modernisation of ships and armament required to enable the Royal Navy to fulfil its primary task in war of safeguarding sea communications. There has been some delay in the construction of frigates, minesweepers, seaward defence boats, and fast patrol boats. Few new ships have been commissioned, but next year should see the completion of a considerable number now under construction. The programme of re-equipment of the Fleet Air Arm has at last got into its stride, and by the end of the coming year all regular squadrons should have received jet or turbo-prop aircraft. Next year should also see the completion of the fleet carrier Ark Royal and two Hermes class light fleet carriers. These and future carriers will be fitted with the angled-deck and steam catapult—British inventions—which have now been adopted also by the United States Navy. Apart from various N.A.T.O. exercises ships of the Royal Navy have carried out exercises in conjunction with those of the Royal New Zealand, Royal Pakistan, and Indian Navies. During the three years of war in Korea 34 ships of the Royal Navy and 16 Royal Fleet Auxiliaries took part in operations. Total casualties suffered by R.N. and R.M. were 59 killed, 10 missing, and 85 wounded. A total of 165 officers and men were decorated and 289 mentioned in despatches. Since the armistice was signed ships of the Commonwealth Navies have remained on patrol in Korean waters. True to tradition ships of the Royal Navy were quickly on the scene following the disastrous earthquakes in the Ionian Islands last August and rendered prompt aid to the victims. No. 848 Helicopter Squadron of the Fleet Air Arm has continued to render invaluable service to the ground forces operating in the jungles of Malaya.

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* It is interesting to work out what is the actual effect of the alleged "remedy." To avoid intricate figures, we may take the case of a Rear-Admiral, Major-General, or Air Vice-Marshal whose standard retired pay on the 1919 scale—after a normal term of service of something over 35 years—may be taken in round figures as £1,000, subject to a variation with the Cost of Living Index, *up or down*. Since the stabilisation of 1935, he has been drawing a pension of £905 instead of £1,000, in spite of a steady rise in the Index since that year to a figure substantially above the peak of 1920. Stabilisation has thus docked him, from 1935 until now, of more than £1,000. The increase now announced will bring his retired pay not up to the 1919 standard of £1,000, but only to £995 10*s*, ignoring not only the rise in the Cost of Living Index since it surpassed the 1919 figure, but also the amount he has been docked by stabilisation throughout all the difficult years of the last war and since. The 10½ pages of Cmd. 9092 are devoted to special pleading designed to demonstrate the "generosity" of the grudging concession it announces. It is doubtless convincing to its authors; but it seems hardly likely to carry much conviction of generosity to the officers affected. The few of them who remain, however, will doubtless die off before very much longer.—*Ed.*

FLAG APPOINTMENTS

The following important flag appointments took place during the year on the dates given:

Second Sea Lord: Admiral the Hon. Sir Guy Russell, G.B.E., K.C.B., D.S.O. (September)

Vice-Chief of the Naval Staff: Vice-Admiral W. W. Davis, C.B., D.S.O. (April)

Fourth Sea Lord: Vice-Admiral F. R. Parham, G.B., C.B.E., D.S.O. (March)

Home Fleet: Admiral Sir Michael M. Denny, K.C.B., C.B.E., D.S.O., to be Commander-in-Chief (January)

The Nore: Admiral Sir Geoffrey Oliver, K.C.B., D.S.O., to be Commander-in-Chief (May)

Plymouth: Admiral Sir Alexander C. G. Madden, K.C.B., C.B.E., to be Commander-in-Chief (November)

America and West Indies: Vice-Admiral J. F. Stevens, C.B., C.B.E., to be Commander-in-Chief and Deputy Supreme Allied Commander, Atlantic (N.A.T.O.) (October)

Home Fleet (Flotillas): Rear-Admiral J. W. Cuthbert, C.B., C.B.E. (July)

Home Fleet (Heavy Squadron): Rear-Admiral W. T. Couchman, C.V.O., D.S.O., O.B.E. (December)

Submarines: Rear-Admiral G. B. H. Fawkes, C.V.O., C.B.E. (February)

Mediterranean: Rear-Admiral J. P. L. Reid, C.B., C.V.O., to be Flag Officer (Air) and Second in Command (February)

Far East: Rear-Admiral G. V. Gladstone to be Flag Officer 5th Cruiser Squadron and Second in Command, Far East Station (November)

Greenwich: Vice-Admiral Sir William G. Andrews, K.B.E., G.B., D.S.O., to be President, Royal Naval College (March)

PERSONNEL

A fundamental change in the system of permanent cadet entry to the Royal Navy was announced by the First Lord, Mr. J. P. L. Thomas, in the House of Commons on November 25, 1953. The change provides for the abandonment of the present 16 year old entry and concentration on a single entry between the ages of 17 years 8 months and 19 years. The last entry at 16 will be in January, 1955, and the first new entry at 18 in May, 1955. (See Chapter XXIII.)

The maximum age limit for the granting of short-service commissions as pilots or observers in the Fleet Air Arm has been extended from 24 to 28 years. About 20 per cent of these officers may be offered permanent commissions during their 8 years' service. The number of short service commissions granted last year was disappointing, except for those four-year commissions offered to young men due for national service who wished to take up flying.

The scheme for re-disposing of ships of the Reserve Fleet in commercial ports under civil contract for care and maintenance has made good progress. Over 100 vessels of the smaller types (e.g. destroyers, frigates, mine-sweepers, etc.) have now been handed over to civil firms, with a consequent saving of uniformed man-power. Nevertheless the shortage of trained and experienced ratings has become more acute during the last 12 months.

The First Lord speaking in the House of Commons on March 9, 1954, revealed that nearly one-third of regular ratings, excluding national service men, were under the age of 21, and that one-third were under the age of 25. He went on to say "We have a great shortage of men with 8 years' service and upwards and their places have to be filled today by abnormally large numbers well below 7 years' service. That situation is obviously extremely serious."

In contrast to this somewhat sombre picture it is once again pleasing to record that recruitment to the W.R.N.S. is satisfactory and that their efficiency remains exceptionally high.

ROYAL NAVAL RESERVE

In the past it has been the practice to allow members of the crews of ships requisitioned in war from the Merchant Navy and Fishing Fleets for service under the White Ensign to continue to serve in their ships on Merchant Navy conditions but with temporary R.N.R. ranks. Such engagements were generally known as T.124. In future this practice will not be adopted. Requisitioned ships will be manned from R.N. and its Reserves.

ROYAL NAVAL VOLUNTEER RESERVE

The 50th anniversary of the formation of the R.N.V.R. fell on June 30, 1953. As this date was so close to the Coronation, the official celebrations to mark the occasion were postponed until 1954. Today the R.N.V.R. comprises 12 divisions, 4 air divisions, and an independent air squadron, with a total strength of about 10,500 officers and men. During 1953 one air squadron carried out its annual training at Malta and 25 officers and 175 ratings were embarked for sea training in the aircraft maintenance carrier H.M.S. Perseus during her passage to and from U.S.A.

ROYAL MARINES

On the occasion of Her Majesty's Coronation the Queen was graciously pleased to appoint Admiral of the Fleet H.R.H. The Duke of Edinburgh as Captain General of the Royal Marines.

During the autumn units of the Amphibious Warfare Squadron and 3 Commando Brigade took part in the N.A.T.O. exercises in the Eastern Mediterranean involving the landing of a complete commando with vehicles.

ROYAL NAVAL MINE-WATCHING SERVICE

The strength of the service has now reached about 3,600. Training is being carried out in nearly 100 centres, and some units have taken part in exercises. Uniform is now being issued. It comprises a navy blue battle dress (with skirts for women), a beret with R.N.M.W.S. badge, shoulder flashes and badges of rank. The badge consists of a silver splash on a blue ground, with two silver waves below, the whole encircled by a gold rope and surmounted by a naval crown in gold.

MATERIAL

The Active Fleet comprises 1 Battleship, 1 Fleet Carrier, 2 Light Fleet Carriers, 10 Cruisers, 6 Daring Class Ships, 20 Destroyers, 33 Frigates, 37 Submarines, and 38 Mine-sweepers. In reserve or employed on training and other duties are 4 Battleships, 5 Fleet Carriers, 4 Light Fleet Carriers, 16 Cruisers, 1 Daring Class Ship, 72 Destroyers, 136 Frigates, 20 Submarines, and about 150 Mine-sweepers.

One Light Fleet Carrier, H.M.S. Centaur, was completed during the year and at the time of writing is about to join the Fleet.

Of the four aircraft carriers under construction, H.M.S. Ark Royal is due tor completion in the coming year, as also are two of the "Hermes" class light fleet carriers—Albion and Bulwark. After 1954–55 this will leave one "Hermes" class still under construction. All these new carriers will be fitted with angled flight decks.

Constructional work on the three "Tiger" class cruisers remains suspended. The eighth and last of the "Daring" class ships is about to join the Fleet. These ships, formerly classified as destroyers, are now known officially as "Daring" Class ships. They were originally built as large fleet destroyers, but are now used tactically as light cruisers. They are regarded as being equally effective in the roles of destroyers, anti-submarine frigates, or aniti-aircraft ships.

During 1953 the first ships of two new types of frigates were launched. H.M.S. Salisbury, launched at Devonport in June, is an aircraft-direction frigate of 340 feet length and 40 feet beam. H.M.S. Dundas, launched at Cowes in September, is the first post-war anti-submarine frigate. She has an overall length of 310 feet and a beam of 33 feet. Her armament includes two three-barrelled anti-submarine mortars. Twenty-one more frigates are now under construction.

The remaining 9 out of 13 destroyers due for conversion to anti-submarine frigates have now been completed, and 2 of the existing anti-submarine frigates have been modernised. Thirty-three coastal and in-shore minesweepers were accepted into the Service during the year and there are now some 115 under construction, of which about 50 have now been launched. A number of seaward defence boats and fast patrol boats have now been completed and the remainder should be ready by the end of 1954–55.

Modernisation of the fleet carrier Victorious continues, and the light carrier Warrior has now rejoined the fleet after modernisation. No details of submarine construction have been published other than the launching of H.M.S. Explorer, to which reference has already been made, but modernisation of existing ships continues.

Some details of new developments in naval armaments have recently been announced. These are a new 6-inch gun, four of which are stated to be capable of delivering about five tons of metal per minute and a 3-inch gun with a rate of fire comparable to heavy machine guns.

THE FLEET AIR ARM

The Fleet Air Arm—it is with almost nostalgic pleasure we record the official revival of this historic and traditional title—will shortly be equipped with four types of modern aircraft. The Sea Hawk has already reached Squadrons. It is a single-engined jet day fighter of conventional design armed with four 20-mm. cannon or rockets and powered with the Rolls Royce "Nene" engine. To date the Wyvern has been delivered to one Squadron. This is a single-seater strike fighter, powered with one Armstrong Siddeley Python turbo-jet engine, armed with four cannon and capable of carrying bombs, rockets, mines, or a torpedo. The remaining two types have suffered delays in production but should reach squadrons in the coming year. These are the Sea Venom and the Gannet. The former is a two-seater single-jet all-weather fighter and the latter is an anti-submarine aircraft, with a crew of three, powered by the double Mamba turbo-prop engine and fitted with electronic search equipment and anti-submarine weapons. Pending delivery of Gannets, a number of American Avengers have been placed in service. A fifth aircraft of particular interest, production of which is scheduled to start shortly, is the Sea Mew. This is a light aircraft designed for anti-submarine duties. It has been hailed in aviation circles as the forerunner of "light-fighters" of comparatively cheap and simple construction combined with light weight. It made its first appearance at the S.B.A.C. Display at Farnborough last year only 17 months after design had commenced.

It is understood that the first production version of the Navy's new swept-wing fighter is due for flight trials shortly. This aircraft based on the Vickers 508 twin Avon fighter which was first seen at Farnborough in 1951 will reportedly be capable of carrying a guided missile or an atomic bomb.

Recently the first anti-submarine helicopter squadron (No. 706) was formed. It is at present equipped with Westland-Sikorsky S.55 machines, similar in type to those operated so successfully for over a year in Malaya by No. 848 Squadron. Orders have been placed for a number of Bristol 173 twin-engined helicopters for anti-submarine duties.

THE ARMY

The strength of the Regular Army has remained at the equivalent of 11⅓ divisions. Its distribution overseas has undergone few changes during the past year apart from those necessitated by reinforcements for

Kenya and the Caribbean area. There is still no strategic reserve at home. In the words of the Prime Minister, Great Britain is "the only country in the world that ever had two years' national compulsory service and not a brigade to defend its own land" (Hansard, March 2, 1954. Col. 1141). Pending a peace treaty in Korea and settlement of the Canal Zone dispute there seems little prospect of withdrawing troops from overseas to build up a reserve at home. About 46 per cent of the Active Army are regular soldiers; the remainder are national service men. The average length of service in the ranks, taking into account both regular and national servicemen, is about three years. Before the war the corresponding figure was nearly seven years.

It is a youthful Army, which is today called upon to carry out many difficult and exacting tasks. In Korea the war was in a sense trench-warfare on the 1914–18 pattern with the added complications of a mountainous terrain and extremes of climate. It demanded a high degree of fortitude, training, and discipline. In Malaya and Kenya the fighting calls for high skill and endurance combined with personal initiative and self-reliance. In Egypt the troops are faced with long periods of routine duties in an atmosphere rendered tense by repeated attacks on their persons and property by armed fanatics and amidst the boredom of poor accommodation in a confined and unattractive area. These are some instances of the varying tasks of the modern Army and the qualities demanded to meet them. It is, therefore, the more remarkable that from all accounts morale and discipline are of the highest order and that fighting efficiency wherever tested has come up to the traditional standards of the British Army.

One of the greatest problems facing the Army today remains that of man-power, particularly as regards regular officers and long service non-commissioned officers. The input of regular officers has increased slightly in the last year, but is still some 10 per cent below requirements. Two measures to increase the intake of technical officers were put into operation in 1953. The first batch of direct entry students joined the Royal Military College of Science. On successful completion of their degree course they will be commissioned into the Regular Army. In September, Welbeck College opened with a batch of 40 boys followed by a further entry of about 27 in January. These boys will receive a public school education for two years and then pass on to the Royal Military Academy. These two establishments should in due course go far towards making up the shortage in the technical arms and services. It will be recalled that at the end of 1952 a system of extended-service commissions was introduced, whereby selected short-service commission officers were to be granted extended service with eligibility for a pension after 20 years. So far nearly 1,800 officers have had their commissions so extended. In the light of the above it would appear that the shortage of officers may well disappear in the next few years. The prospects are certainly more hopeful than they were two years ago.

Regarding the shortage of long-service other ranks, from whom the future warrant officers and senior N.C.O.'s must be found, the prospects are still a matter of speculation. Regular recruiting has declined by about 10,000 during the last 12 months. Out of the total of 39,000 men recruited, about 17,000 enlisted for the 22 years' engagement, under which they can opt out after every period of 3 years, and some 22,000 enlisted on the single 3-year engagement.

Recruitment of boys has remained entirely satisfactory—the figure being over 2,600.

The 3- and 22-year engagements were introduced late in 1951 so that the coming year should give some indication of the way in which the wind blows as regards re-engagements under the former terms and the right to opt out after 3 years under the latter terms. During the last year the number of re-engagements and extensions (under the old terms of service) declined to 3,368 and 615 respectively as compared with 3,813 and 891 in 1952. This decline, whilst not in itself serious, may denote a tendency which in the long run might become of serious consequence. Probably the most telling factor militating against the build-up of a long-service regular content in the Army lies in the high percentage of overseas service combined with the shortage of married quarters in most overseas stations. For this there is no short term remedy, and in the case of the Canal Zone in particular there is no justification for new construction since our aim is to withdraw the troops. In areas where long-term garrisons (e.g. Cyprus) are established steady progress has been made in the construction of married quarters and modern barrack accommodation over the past few years. These and other recent measures, such as improved pay and free leave passages home by air from certain overseas stations may in time have the desired effect of attracting more men to take up the Army as a career.

In the women's services there has been some improvement in the intake of officers for the Q.A.R.A.N.C., but the Corps is still 37 per cent below its establishment of officers. The strength of other ranks is satisfactory. The strength of the W.R.A.C. has shown little variation in officers and other ranks during the last year.

In most overseas stations collective training has of a necessity been limited by the difficulties of withdrawing units from their day-to-day tasks. It has, therefore, been confined mainly to Germany for the Regular Army, and to England for the Territorial Army. In Germany a series of command exercises with signals were carried out to practice on the command and staff level cooperation between the British Army of the Rhine and the 2nd Tactical Air Force.

In the large-scale exercise carried out by Northern Army Group in the autumn 11th Armoured Division was placed under command of the Netherlands 1st Corps. The main emphasis in B.A.O.R., however, has been on unit and formation training up to the divisional level.

Three divisions of the Territorial Army carried out formation training on Salisbury Plain during the summer. These were the 42nd (East Lancashire), the 50th (Northumbrian), and the 51st (Highland) Divisions. In addition a major exercise was mounted by the 16th Airborne Division T.A. in Norfolk, in the course of which about 1,200 officers and men of the 44th Parachute Brigade together with vehicles and guns were dropped by 27, C.119 aircraft of the U.S.A.F. flown over from Germany. The annual demonstration of amphibious warfare for the students of the three Services Staff Colleges was staged in May. In the first part at Eastney an invasion force of Royal Marines and units of the Regular and Territorial Armies were put ashore by ships of the Royal

Navy. The exercise, in which aircraft of R.N. and R.A.F. took part, was designed to illustrate the entire technique of amphibious assault from the preliminary reconnaissance stage up to the consolidation of the beach head. The second part was a demonstration by R.M. Commandos of a raid on a coast-line bordered by cliffs, and showed methods of projecting ropes by rockets and mortar. Last summer the C.I.G.S.'s annual indoor exercise at Camberley was devoted to a study of the problem of movements, supply, and communications under atomic attack and also of the strategic and tactical uses of atomic weapons.

In June, 1953, East Africa was formed into a separate Command. Hitherto it has formed part of Middle East Land Forces. The new Command embraces Kenya, Uganda, Tanganyika, Zanzibar, and the Seychelles Islands. Northern Rhodesia and Nyasaland which formerly came under the East African Command are now within the new Federation of Rhodesia and Nyasaland.

It was recently announced that some reorganisation would shortly take place in Anti-Aircraft Command. Some heavy and light anti-aircraft regiments of the Territorial Army will be transferred to the field army, and a few heavy anti-aircraft units will be converted to medium artillery. Some further units will undergo amalgamation. This reorganisation no doubt is a prelude to the introduction of guided missiles into our anti-aircraft defence. These will be the responsibility of the R.A.F. when they become available.

In 1953–54 the sum of £164,000,000 was allotted in the estimates for warlike stores, of which £50,000,000 was required for ammunition. In the 1954–55 estimates the figure is reduced to £150,000,000. The main new items of equipment issued to units during the past year include the Bat 120-mm. recoil-less anti-tank gun, the 3·5-inch rocket launcher, the Energa anti-tank grenade, and some modern load-carrying vehicles. Details of other arms and equipment under production or design will be found in the Memorandum accompanying the Army Estimates 1954–55, which is reproduced in the Reference Section on page 412.

SENIOR APPOINTMENTS

The following appointments to the more important commands and staff posts took place during the year:

Adjutant-General: General Sir Cameron G. G. Nicholson, K.C.B., K.B.E., D.S.O., M.C. (September)

Commander-in-Chief, Middle East Land Forces: General Sir Charles F. Keightley, G.C.B., K.B.E., D.S.O., A.D.C. (September)

Commander-in-Chief, Far East Land Forces: Lieutenant-General Sir Charles F. Loewen, K.B.E., C.B., D.S.O. (September)

Commander-in-Chief, East African Command: General Sir George W. E. J. Erskine, K.C.B., K.B.E., D.S.O. (June)

General Officer Commanding-in-Chief, Eastern Command: Lieutenant-General G. K. Bourne, C.B., C.M.G., C.B.E. (June)

General Officer Commanding-in-Chief, Western Command: Lieutenant-General Sir Charles Loewen (May); Lieutenant-General Sir Lashmer G. Whistler, K.B.E., C.B., D.S.O. (December)

General Officer Commanding-in-Chief, Northern Command: Lieutenant-General G. C. Evans, C.B., C.B.E., D.S.O. (May)

General Officer Commanding-in-Chief, Anti-Aircraft Command: Lieutenant-General M. S. Chilton, C.B., C.B.E. (April)

Controller of Supplies (Munitions), Ministry of Supply: Lieutenant-General W. J. Eldridge, C.B., C.B.E., D.S.O., M.C. (October)

Commandant, Staff College: Major-General C. P. Jones, C.B., C.B.E., M.C. (January)

Commandant, Royal Military Academy: Major-General R. G. S. Hobbs, D.S.O., O.B.E. (February)

Commander, Commonwealth Division, Korea: Major-General H. Murray, C.B., D.S.O. (October)

Commander, 6th Armoured Division: Major-General F. N. Mitchell, C.B.E., D.S.O. (October)

Commander, 7th Armoured Division: Major-General K. C. Cooper, D.S.O., O.B.E. (December)

Commander, 1st Federation of Malaya Division: Major-General W. H. Lambert, C.B.E. (October)

On July 21, 1953, General Sir John Harding, G.C.B., C.B.E., D.S.O., M.C., A.D.C., Chief of the Imperial General Staff was promoted to be Field Marshal.

PERSONAL SERVICES

In introducing the Army Estimates in the House of Commons on March 11, 1954, the Secretary of State for War (Mr. Antony Head) gave some details of a new scheme for granting free leave passages to regular officers and other ranks serving overseas who are separated from their families. The scheme comes into effect on April 1, 1954, and briefly embraces the following. In the Canal Zone and Kenya, one return passage by air home after nine months' separation in overseas stations, where parents have been forced to leave their children at home for educational and other reasons, free return air passages for the children to join their parents for 28 days every two years; in Europe, one free return passage home for the whole family during the husband's tour of duty. In October, 1953, the privilege of discharge by purchase suspended at the outbreak of the Korean War was restored. In general the conditions follow the principles laid down in 1948.

To relieve the increasing burden falling on the volunteer element in the Territorial Army the number of Regular and Regular Army Reserve Officers posted to T.A. units is being increased. It is aimed to have three of these officers with each major unit, and one with each minor unit. In addition retired warrant officers and N.C.Os. (corporals and above) are now being invited to volunteer for attachment to T.A. units.

WOMEN'S ROYAL ARMY CORPS

An extended short-service commission scheme for W.R.A.C. officers has recently been introduced. The scheme is parallel to the scheme for male officers. It allows officers holding short-service commissions to engage for an initial period of 5 years, and then in 3-year periods up to the age of 55, with eligibility for retired pay after 20 years' service.

W.R.A.C. T.A. personnel are in future to be employed with certain Coast Regiments. Their duties and employment will be similar to those now carried out by women in Anti-Aircraft Command.

Recently the first mixed Army Emergency Reserve unit was formed. It is a movement control group, and the W.R.A.C. personnel are all employees of Messrs. Thomas Cook and Sons.

AWARDS OF THE VICTORIA CROSS

On October 27, 1953, it was announced in a Supplement to the London Gazette of October 23 that H.M. The Queen had been graciously pleased to approve the award of the Victoria Cross to:

Lieutenant-Colonel J. P. Carne, D.S.O., The Gloucestershire Regiment "in recognition of gallant and distinguished services in Korea."

On December 1, 1953, a similar announcement was published in respect of the posthumous award of the Victoria Cross to:

Lieutenant P. K. E. Curtis, The Duke of Cornwall's Light Infantry attached to The Gloucestershire Regiment.

The magnificent stand of the 1st Gloucesters at the Imjin River in April, 1951, has passed into history. Lieutenant-Colonel Carne was their commanding officer. He was taken prisoner-of-war with the survivors of his battalion and was released after the Armistice.

ROYAL AIR FORCE

The strength of the Active Air Force declined by about 10,000 men and women during the last year. There was no reduction in first-line fighting strength. The decline was mainly due to reductions in flying training establishment, which had been rapidly expanded in the initial stages of the armament programme. The strength of regular male officers and airmen remained at an even level of about 188,000; national service personnel decreased by some 8,000, and the W.R.A.F. also decreased by 400 women. The intake of regular recruits fell to about 32,000 as compared with 40,000 in 1952. There was a slight improvement in the number of re-engagements, but amongst the men on 3-year engagements not more than 3 per cent are at present prolonging their service. There is, therefore, some cause for anxiety regarding the shortage of men who are prepared to prolong their engagements. It is from amongst these that N.C.Os. and technicians for the future must largely be found.

The most serious man-power problem is in aircrews. During the last year the numbers coming forward for aircrew training fell from 14,000 to 7,000. Referring to these figures in the House of Commons on March 4, 1954, the Under-Secretary of State for Air (Mr. George Ward) stated that unless there was a considerable improvement the R.A.F. would not have the numbers of trained aircrew needed in two years' time. As one means of attracting more young officers for flying duties he announced that the short-service commission scheme as such would be abolished. Instead all officers joining for flying duties, except those entering through the R.A.F. College, Cranwell, and the universities, would do so initially for 12 years, with the opportunity to transfer to a permanent commission within a few years of completing their training. Those who wished to leave the Service after 8 years would be able to do so with a tax-free gratuity of £1,500, increasing to £3,000 after 12 years' service. It was anticipated that permanent commissions either in the General Duties Branch, or in one of the other branches would be available for all of these direct entry officers who wished to make the R.A.F. their career. As a further means of attracting young officers a scheme of scholarships to Cranwell was recently introduced. For the first competition under this scheme there were over 300 applicants from 216 schools, and it is planned to fill 40 per cent of the vacancies at Cranwell by this method. Finally it is hoped that the recently announced increases of pay will help to improve the man-power situation as regards middle rank officers, N.C.Os. and technicians.

There has been little change in the male strength of the R.A.F. Volunteer Reserve and Auxiliary Force during the past year but both the W.R.Aux. A.F. and the W.R.A.F.V.R. showed an appreciable reduction..

The main emphasis on expansion and re-equipment during 1953 has been in Coastal and Bomber Commands. The former has received further deliveries of Shackletons and has now virtually reached its target under the original rearmament programme. In Bomber Command the last of the Washingtons, loaned by the United States, has now been taken out of service and the squadrons formerly equipped with them have been converted to Canberras.

Recently the first squadron of Fighter Command to be re-equipped with British swept-wing aircraft converted to Swifts, and the Hunter is due to reach squadrons shortly. During the coming year deliveries of these two aircraft should reach a steady flow, and by the end of the year it is hoped that about half the day-fighter squadrons will be equipped with them. In the meantime a number of squadrons have been temporarily equipped with American Sabre-jets. As yet no date has been given for the introduction of the all-weather Javelin into the Service. The main armament of 2nd Tactical Air Force comprises Venom fighter/ground attack aircraft, which are replacing the Vampire, and Sabre-jets. There have been no notable changes in Transport Command which is based on the Valetta and the Hastings. Squadrons equipped with both types have been engaged on a number of tasks including the transport of reinforcements to Kenya and the evacuation of casualties from the Far East. In Malaya the support given to the ground forces by R.A.F. and R.A.A.F. squadrons has continued on an increased scale. In addition to bombing and supply dropping the R.A.F. have carried out a complete air survey of Malaya to remedy the existing defects in local maps of the country. Whilst in Kenya a squadron of Harvards and four Lincoln bombers have been continuously engaged against the Mau Mau terrorists.

TRAINING

The air training group in Southern Rhodesia has now been disbanded and flying training is confined to Great Britain and Canada. During 1953–54 some 2,800 pilots, navigators, and air signallers were trained as compared with 2,900 in the previous year. Of these 860 were trained in Canada. The number of civilian-operated Flying Training Schools has now been reduced from 21 to 7 and the remainder are to be closed in the near future. There have been comparable reductions in the Ground Reserve Training Centres. Reservist policy now aims primarily at maintaining a first-line reserve of personnel—aircrew and ground—who would require no further training on mobilisation. Refresher training of aircrew reserves is, therefore, to be confined to those men who have already qualified operationally and who have not long been off operations flying. They will carry out their annual training with regular units. Similarly ground reservists will do their refresher training at those stations to which they will be posted on mobilisation. A start has been made with these arrangements in the Control and Reporting units of Fighter Command, and they will be extended to the rest of that Command, to Bomber Command and later to other home Commands.

Apart from numerous N.A.T.O. exercises in which formations of the R.A.F. participated, the most important exercise was "Momentum" which took place between August 14 and 23, 1953. The main object of this exercise was to test the whole of the defence system of the United Kingdom. It was under the overall control of Air Marshal Sir Dermot Boyle, A.O.C.-in-C. Fighter Command. In addition to Bomber and Fighter Commands, R.C.A.F. and U.S.A.F. units stationed in the United Kingdom together with 2nd Tactical Air Force, 4th Allied Tactical Air Force, the Fleet Air Arm, the Royal Auxiliary Air Force, Class "H" and "E" Reservists, and the Royal Observer Corps took part. The exercise in the main took the form of a battle between Bomber Command's Canberras and Fighter Command's Meteor and Vampire night fighters. Although the defenders were handicapped by lack of high-performance aircraft, the exercise was a valuable try-out of the defence machinery and tactics to be employed in the near future when Swifts, Hunters, and Javelins will become available. It was noticeable that the percentage of successful interceptions was higher by night than by day.

The majority of the Royal Auxiliary Air Force, which now numbers 20 squadrons and 26 fighter Control units, carried out their annual training overseas—in Germany and Malta.

EQUIPMENT

For security reasons few details are published of new R.A.F. equipment. The following items which are based on published information are of general interest:

The Javelin all-weather day and night fighter should be capable of operating at over 50,000 feet and have a speed of 600 to 700 miles per hour. It will be equipped with search radar of high performance and will be capable of finding and attacking the latest types of bombers under all conditions. A new type of cannon is included in the armament of the Swifts and Hunters. This is understood to be a 30-mm. weapon capable of firing some 1,200 rounds per minute. Of the three V-Class long-range medium bombers now on order, the first production Valiant is undergoing flying tests and provision has been made in the estimates for further deliveries in the coming year. The Vulcan and Victor, which are both of higher performance than the Valiant, are not far behind as regards production. All three bombers will be capable of carrying atomic bombs and will form the basis of a strategic air force. In addition to the large number of Hunters on order for the R.A.F., N.A.T.O. "off-shore" order for 460 have been placed in Holland and Belgium for the Belgian, Dutch, and United States Air Forces. Helicopter squadrons are now being formed for search and rescue duties in Fighter and Coastal Commands, and some machines are being employed on air observation post duties with the Army. Two more helicopter squadrons are to be formed for the Middle East and Malaya; the former for search and rescue and the latter to replace No. 848 Royal Naval Squadron.

Two notable records were achieved by Service-type aircraft during the year. An Olympus-engined Canberra attained the world's altitude record at 63,668 feet and a Swift attained a speed of 737·3 m.p.h. The latter record was, however, beaten shortly afterwards by an American aircraft. In the England–New Zealand Air Race in October, 1953, Canberras were placed first and second in the speed section. An R.A.F. Canberra P.R. Mark 3 completed the course in an overall time of 23 hours 51 minutes, and an R.A.A.F. Canberra Bomber Mark 20 in 24 hours 32 minutes. The flying time in each case was 22 hours 29 minutes. During recent years the main bottleneck in the production of new types of Service aircraft has occurred in the flying testing stage. The procedure has been for the Ministry of Supply to order one or two prototypes. With these full tests have to be carried out to cover flying performance, all electronic equipment, armaments and bomb-dropping. Frequently progress is held up for long periods whilst modifications are carried out, and occasionally a complete machine is crashed and written off. The period of these tests may, therefore, take up to three years. In the House of Commons on March 1, 1953, the Minister of Supply (Mr. Duncan Sandys) announced that, in order to reduce these delays, a new policy was to be introduced. He stated that in future, where appropriate, a number of development aircraft would be ordered with the object of speeding up trials and modifications. He went on to say that in the case of a new supersonic fighter now under development, 20 aircraft had been ordered in addition to the usual prototypes. This new policy should go far to ensure that the prolonged delays between design and production, which have handicapped the R.A.F. (and the Fleet Air Arm) in recent years, will be eliminated in the future.

APPOINTMENTS

The following important appointments took place during the year on the dates given:

Vice-Chief of the Air Staff: Air Marshal Sir Ronald Ivelaw-Chapman, K.C.B., K.B.E., D.S.O. (October)

Deputy Chief of the Air Staff: Air Marshal T. G. Pike, C.B., C.B.E., D.F.C. (October)

Air Member for Personnel: Air Chief Marshal Sir Francis J. Fogarty, K.C.B., K.B.E., D.F.C., A.F.C. (November)

Ministry of Supply: Air Chief Marshal Sir John W. Baker, K.C.B., M.C., D.F.C., A.D.C. to be Controller of Supplies (Air) (October)

Fighter Command: Air Marshal Sir Dermot A. Boyle, K.B.E., C.B., A.F.C., to be Air Officer Commanding-in-Chief (April)

Coastal Command: Air Marshal Sir John Boothman, K.B.E., C.B., D.F.C., A.F.C., to be Air Officer Commanding-in-Chief (November)

Second Tactical Air Force: Air Vice-Marshal Sir Harry Broadhurst, K.B.E., C.B., D.S.O., D.F.C., A.F.C., to be Commander-in-Chief (January)

Middle East Air Force: Air Marshal C. B. R. Pelly, C.B., C.B.E., M.C., to be Commander-in-Chief (October)

R.A.F. Staff College: Air Vice-Marshal D. Macfadyen, C.B., C.B.E., to be Commandant (November)

Aden: Air Vice-Marshal S. O. Bufton, C.B., D.F.C., to be Air Officer Commanding British Forces (October)

PRESENTATION OF THE QUEEN'S COLOUR

On March 17, 1953, Her Majesty presented a Queen's Colour to the Royal Air Force Regiment at a ceremonial parade in Buckingham Palace.

D. A. L. WADE

CHAPTER III

THE ROLE OF THE ROYAL NAVY

A Speech by Admiral the Earl Mountbatten of Burma

The following exposition of the duties and responsibilities of the Royal Navy in peace and war was given in a speech by Admiral the Earl Mountbatten, K.G., on the occasion of his receiving the Freedom of the City of Edinburgh on January 18, 1954. *It is here reproduced by his permission.*

You may perhaps imagine how honoured any man might feel to receive the Freedom of the City of Edinburgh, or an Honorary Degree from Edinburgh University. But that both these distinctions should be conferred on one man, and this on the same day, surely constitutes a double event calculated to turn the head of any man. And as if to pile Pelion on Ossa, my wife—separately, and on her own account—is also here to-day to receive these double honours at the same time as myself. It is difficult for me to find the words that would express to you our joint sense of pride and our deep appreciation, and we are particularly sensible of the fact that these dignities, valuable as they are in themselves, should be bestowed on us at the hands of such outstanding men as Sir James Miller and Sir Edward Appleton.

It is as a Naval Officer that I come here to-day and in receiving the honours you are bestowing on a life-long sailor, I would like to acknowledge the loyal and excellent service which it has been my pride and good fortune to receive from the officers and men I have commanded, particularly since I returned from India, more than five years ago, to resume my life's profession: service in the Royal Navy.

I do not know what proportion of the Navy are Scots; but those we have certainly seem to come to the top. Not only is the present First Sea Lord, Sir Rhoderick McGrigor, a Scotsman, but so were his three immediate predecessors. And for good measure we have yet another one, Sir John Lang, as Permanent Secretary of the Admiralty. What is more, you have chosen, as High Commissioner of the General Assembly of the Church of Scotland, our most distinguished Admiral of the Fleet, Lord Cunningham, whose banner hangs in the Thistle Chapel here. So it is beginning to look like the "closed shop."

The Navy is proud of its time honoured connection with your historic city, which is typified by the naval part of Sir John Lorimer's fine war memorial. Some of you may remember that when the Russians in the First World War re-named Petersburg, Petrograd, the Navy referred to Edingrad for quite a long time—or even Grad, for short, as a mark of affection!

My own Service association with Edinburgh began as far back as 1916, when I joined the Battle Cruiser Lion in the Firth of Forth. I was just sixteen, and it was here that I experienced my first shore-leaves from a sea-going ship; for when we were not actually at sea or on duty and the Fleet was at four hours' notice, we were allowed to come here for the afternoon. On these visits I was able to form some impression of the friendliness your lovely city has to offer; and if I associate Edinburgh with some of my happiest days in the Service, this is not entirely because my wife and I spent two months here, very soon after our honeymoon, while my ship, the Revenge, was refitting at Rosyth.

I want to speak to you to-day about the Navy, in whose life your city has so long played so great a part; not only because I believe the Service offers a fine career for an island people, and a fine all-round upbringing for any man—but also because I feel that there are many of the Navy's functions and responsibilities that are hardly realised by people outside the Service. Our war-time duties are well enough appreciated; I think indeed that few people underrate their importance, for they have been largely instrumental in saving the life of our country twice within living memory. For in both world wars we came within measurable distance of defeat by starvation: a fate only averted by getting through sufficient sea-borne supplies, amounting to about a million tons a month, whose protection is, of course, the Navy's responsibility in conjunction with Coastal Command.

It takes years to design and build a ship; so a great many ships are kept in the Reserve Fleet; "in mothball," as it were; though getting older all the time. But it also takes years to train a professional sailor, and provide him with adequate experience; and this experience cannot be got on land. No amount of classroom instruction in peace time will fit our officers and men to fight their ships in war and deal successfully with the menace of submarines and mines; so the more ships there are at sea the better trained will the regular sailors be. Unless enough experienced regular officers and petty officers are available to provide the expert nucleus for each ship, the civilians who gallantly go to sea in war and indeed provide the vast bulk of our ships' companies, could never be moulded into the competent sailors they became during the last war.

While its war time potentialities are being "nursed," one of the routine functions of the Navy in peace-time is the development of weapons—electric and electronic apparatus and propulsive machinery. Great progress in the marine gas turbine, for instance, is due to all those, whether ashore or afloat, who take their inspiration from and give their lives to the Royal Navy. The most significant advance in Diesel engines in recent years, the "Deltic," was sponsored by the Admiralty. Although I am sure everybody knows that the Royal Navy invented aircraft carriers, how many realise that we have retained the lead in devising means of operating the latest types of aircraft from them? For example, the Angled Deck—an entirely new scheme for landing the fastest jet aircraft slantwise on a flight deck, whilst retaining the "Deck Park" of aircraft on the forward end of the Flight Deck; or the great steam catapult, which enables the most powerful aircraft to be launched from a carrier whose length of flight deck would otherwise be much too short. Thus the Navy can bring air power to its task of controlling sea communications in war in circumstances when only seaborne aircraft can operate effectively.

Other functions of the Navy in peace time, which one could class strictly as preparedness for war, cover the holding of exercises with Allied Fleets, so as to ensure our ability to work efficiently together. A valuable by product is the forging of links of friendship and understanding between them and ourselves. Then there is the help the Navy provided when the Atomic Research Organisation carried out their first tests in the Montebello Islands; for the Hydrographer of the Navy first selected the site from a study of the imcomparable collection of original survey documents held in the Admiralty, dating back to Cook, and a Naval Surveyor went in the first reconnaissance party to confirm the choice. Subsequently we provided the floating laboratories and homes in which the scientists worked and lived, and we also actually carried the atom bomb out, and made the necessary preparations for the explosion.

I said just now that these functions of the Navy are better known than those which it accomplishes in peace-time, which in themselves are of a purely peaceful nature. And it is really about the latter that I want to speak, for I do not think it is generally appreciated that they cover a very considerable field.

First of all we are the Queen's ships and it is our privilege and pride that ships of all the Commonwealth Navies should be providing the various naval escorts for Her Majesty and His Royal Highness the Duke, who is also Chancellor of Edinburgh University and a Freeman of this city, on their voyage round the world.

Then there are our surveying ships, seven of which are at this moment engaged in survey work. They are constantly charting those parts of the ocean that have not been previously surveyed and bringing up to date old surveys—particularly where there are frequent changes in the shoals, as for instance in the tidal waters of the Thames Estuary where the Edinburgh Channel alone has to be re-surveyed at least once a year. In more distant parts the growth of coral reefs or volcanic disturbances may even change the coastline.

The insatiable curiosity of sailors over the centuries has brought into being the Admiralty's interest in expanding the horizon of human knowledge. Not only does the Hydrographer chart the seas, but the Navy's Astronomer Royal explores the heavens. For oceanographical research and arctic exploration the Admiralty sponsors the National Institute of Oceanography and has taken the lead in fathering the British North Greenland Expedition under Commander (L) Simpson, which has just had its second Christmas in Greenland studying meteorological conditions and ice formations as well as physical geography.

Or let us take the fishing industry which is worth about £45,000,000 a year to the British Isles. Fishery Protection ships look after the fishing fleets and see to it that they are not molested, and that our coastal fishing grounds are not poached by foreign fishing vessels. The Royal Navy ensures this duty for the Sassenachs but Scotland provides her own fishery protection except for an ocean minesweeper which is borrowed from us.

The Royal Navy also police the seas in a more general way; let me quote two instances which recently occurred on the boundaries of the Mediterranean Command. Some fifteen months ago H.M.S. Alacrity assisted in quelling a mutiny in a merchant ship off Gibraltar; and last month the frigate Flamingo arrived at Aden towing an Indian dhow which she had recaptured in the Red Sea from pirates in the good old story-book manner. Cruisers are particularly suitable to afford protection to British lives in any part of the world at very short notice and can, moreover, often do so by their mere presence in an unprovocative way.

In places like Malta, Gibraltar, Singapore, and Hong Kong the Naval Dockyards frequently undertake repair work for merchant ships; while Royal Fleet Auxiliary tankers also undertake charters for carrying oil for commercial purposes at times; and naval tugs and salvage craft help out where necessary in cases of ships in distress. In the comparatively calm waters of the Mediterranean alone, during the last two years, the Fleet has helped three ships in distress and rescued the occupants of four aircraft who came down in the sea; not to mention the help given by our warships in all other parts of the world.

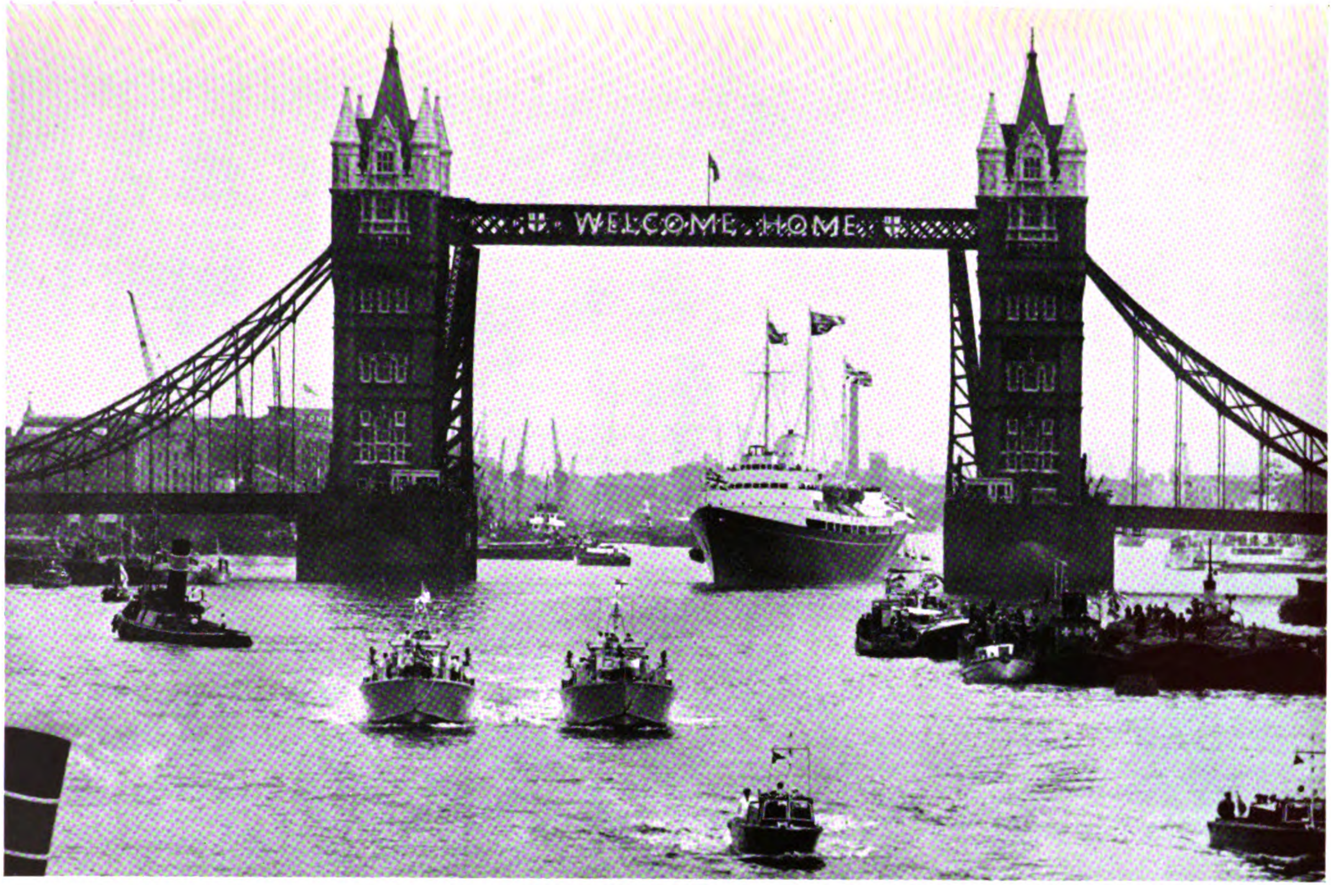
The Navy is admirably equipped to undertake humane jobs of this kind literally at a moment's notice. Naval helicopters, for instance, have not only played an irreplaceable part in jungle operations in Malaya, but were able to give invaluable aid in the floods along the East Coast and in Holland last year, as well as during the terrible earthquakes in Cyprus, and in the Ionian Islands. Some of the ships that went from Malta to help in this last calamity could be equipped with special teams of doctors and medical units, and had special stores put on board before leaving Malta; but others like the cruiser Gambia, which was on her way from Port Said and was diverted without any warning, had on board enough of the right equipment, stores and personnel to enable her to help with first aid, medical attention, firefighting, clearing rubble from the streets, repairing power stations, and passing on news to the rest of the world outside the stricken area, besides providing large quantities of food.

If it surprises anyone that the Gambia should have been equipped for every emergency, as a routine matter, perhaps it is because he has not realised to what extent ships of any size to-day represent a microcosm of the civic structure that one finds on land. A destroyer has a complement of 250—about the size of a village; whilst a big fleet carrier has a ship's company up to ten times as big—about the size of a small market town. If we look more closely at the social structure of a fleet carrier, we will see that this floating market town contains a parallel to most of the institutions of its land-locked twin.

First of all we find the doctor; and as an example of the unexpected situations with which the Navy may have to deal, may I remind you that a baby was born on board H.M.S. Eagle during the Coronation Naval Review—but a suggestion that the Eagle should be re-named the Stork was not followed up!

Then there is the dentist. In 1947 a high official being taken in one of Her Majesty's ships to one of our dependencies in the Pacific, lost his dentures over the ship's side (when he was ridding himself of his breakfast one presumes!)—but was able to deliver a most impressive peroration on landing, next morning, for the dental officer and mechanic had made good the deficiency in the meanwhile. And incidentally, this same ship reported, when cruising in the Pacific Islands, that her dental services were in constant demand by traders, officials, and even missionaries who came from far and wide to have their teeth seen to.

Next we have the schoolmaster, who, besides taking care of youth and adult education, runs a reference and a recreational library. There is also the parson, with his chapel; and the local cinema, with a really up-to-



A UNIQUE HOMECOMING

The Royal Yacht, H.M.S. Britannia, with Her Majesty the Queen, the Duke of Edinburgh and their children on board, entering the Pool of London on May 15th, 1954, on Her Majesty's return from her Commonwealth Tour of circumnavigation.

date programme twice weekly. There is the bakery, the butcher's shop, and the grocer's; there are tailors, bootmakers and barbers; a general store run by N.A.A.F.I.; a cold storage; a laundry; a garage (for any vehicles that may be carried on board); a bookstall; a stationer's shop, and a post office. There is the police station (and the jail!); and a telephone exchange (with hundreds of numbers); as well as wireless transmitters and receivers; a printing press; and most likely a small local newspaper.

I must not forget to mention the fire brigade. I told you how they took part in fire-fighting in the earthquake zones; so I can tell you that they surpassed themselves at South Queensferry some years ago, when a fire broke out in the whisky distillery there—arriving on the scene before any of the local fire brigades, in the face of what I think may well have been fierce competition! I hope that virtue was not, on that occasion, its own reward.

The floating market town I have been describing also has things that market towns do not have. Its own airfield and its own aircraft, for example, its own meteorological station; and it has means of communicating with the outside world by radio-telephone.

We find it even has its own soldiers stationed on board—in the form of Royal Marines. The Marines have their band—now in their pre-war full dress again—and apart from playing in the local bandstands or concert halls at ports the ship may visit, it often carries out the colourful ceremony of "Beat Retreat" on shore, as a gesture of goodwill to the local population.

For an important part of the peace-time activities of Her Majesty's ships consist in "showing the flag"—not only by visiting ports round the world, but even in one case by lending an aircraft carrier to be specially fitted as a mobile part of the Festival of Britain. In particular when our ships are abroad these typically British towns are bodily transported to some foreign port where local visitors, often in their thousands, are welcomed on board to see this sample of British life. Furthermore it is possible for our libertymen, when they go ashore, to be Britain's best Ambassadors.

To end I should like to read to you the dictum of Lord Charles Beresford, who was Commander-in-chief, Mediterranean almost fifty years ago:

> It is contrary to common sense and practical experience to suppose that British naval power should be organised only for purposes of battle. The British Fleet heretofore carried the British Flag and the British ideas of justice and good government to every corner of the globe, and the service rendered to the peace of the world by the British Navy is not to be reckoned in first-class battleships, armoured cruisers and torpedo craft alone.

He went on to stress the Navy's great value:

> for kindly and often necessary ministrations of charity and consolation as well as for the courtesy and compliments which form no inconsiderable part of the complex duties of the British Fleet.

These words of my illustrious predecessor are as true to-day as they were forty or fifty years ago; ships and weapons may change, but these words express a perennial truth about our Navy. For the Navy is in many respects a microcosm of the people of these islands, with their qualities and their defects, but above all with their native adaptability, resource, and imagination developed to a high degree by the very nature of what it is called upon to do, in peace and war.

I hope I have been able to transmit to you, today, some idea of why it is that we sailors are proud of the Service for which we have the privilege to work.

CHAPTER IV

THE ROLE OF MODERN INFANTRY IN BATTLE

By General Sir Harold E. Franklyn

Experience in World War II shows that although Armoured Forces often play an important part in the opening and concluding stages of campaigns, the Infantryman is usually in greatest demand during the middle period when the most stubborn fighting takes place. As we know this period may last for years. It is also interesting to note that in the most recent campaigns on any considerable scale—in Korea and in Indo-China—the foot soldier has been supreme on both sides. Only he could climb the hills of Korea, wade the numerous rivers and streams and negotiate the swampy rice fields of Indo-China. This is not due entirely to the peculiarities of terrain in either country, as they are in many respects quite different. It seems likely, therefore, that the Infantryman will still assume the major role on land in any future war, and if this is so it will be profitable to discuss the organisation, equipment, and methods of the modern Infantry soldier.

Before attempting to estimate the part which infantry will be called upon to play in wars of the future it is first necessary to examine whether there is likely to be any radical change in the way in which these wars will be fought. There is a temptation to attribute exaggerated importance to every new invention designed to increase the power to wage war. Some of these inventions seem to be of such a revolutionary character that there is a demand, usually among those without much experience or balance, that previously accepted methods should be discarded. The advent of gunpowder, rifles, automatic weapons, modern artillery, gas, aeroplanes, and tanks, each in their turn, had this effect to a greater or lesser degree, and yet sooner or later antidotes were found. The upshot has been that, although tactical ideas have had to be changed materially, the clash of armed forces in battle has not been fundamentally different from what it was centuries ago.

At the moment atomic power, whether used from the air or eventually from the ground, appears so overwhelming that it is indeed difficult to assess its effect on wars of the future. Yet surely and inevitably the balance will be restored, as it always has been, by antidotes or at least palliatives. Until atomic missiles have been used on the battlefield their effect on tactics must remain a matter of conjecture. Although it is of vital importance that military thinkers should try to peer into the future, there is no justification for anyone to be dogmatic on the matter yet. Some would have us believe that such will be the effect of atomic power that campaigns will be fought out almost entirely between swiftly moving armoured forces supported from the air. The offensive power of such forces is almost unlimited and their mobility makes them a poor atomic target. Their defensive power, however, is small, yet base installations, lines of communication, capital cities, industrial areas, and all the varied means of production will have to be protected from assault by land as well as from the air. No amount of manœuvring by armoured forces will suffice to protect these and other vital areas; they must be defended by troops of all arms. If this is so the attack on positions defended in this way cannot be made either effectively or economically by armoured divisions, the attack must in fact be made also by a force of all arms. In such battles infantry must continue to play a predominant part and it is therefore important to see how this part can best be played, making due allowance for the effect of atomic weapons as far as this effect can be estimated but without exaggerating it.

From the point of view of the foot soldier the battlefield was already becoming an increasingly difficult place in which to exist, let alone move, even before the advent of atomic weapons. Infantry holding a defensive position can provide some protection for themselves, but once their defended localities have been definitely located by the enemy they can be subjected to accurate artillery fire, to attack from the air, and they will be particularly susceptible to atomic bombardment. Until quite recently an attack by tanks constituted one of the greatest dangers to the defence, but recent developments in anti-tank guns have tended, perhaps only temporarily, to reduce this threat. When considering infantry in the attack it is surely asking rather much of human nature to expect an unprotected man to advance in daylight over ground swept by bullets, the number of which will have been greatly increased by the adoption of automatic rifles. It is true that in both the recent great wars infantry have held positions to the last man and have attacked successfully by day over open ground in spite of very heavy losses, but the question must arise as to whether there is not a limit to their powers of endurance in view of the many inventions designed to exterminate them. This limit has certainly not yet been reached, for although inventions designed to help the infantry may have lagged behind, they do to some extent cancel out those intended to destroy. Only when infantry can no longer be counted upon to hold any position or to be able to carry out any attack will they cease to have a place, and a most important place, on the battlefield. Success or failure in war will increasingly depend on which side makes the best use of the varied forms of assistance available. Research and study by the highest authorities in any army, therefore, is vitally important to ensure that the best techniques are evolved for getting maximum results from modern invention. This needs a great deal of imagination if tactics are not to be based too much on the experience of the last war. Even, however, if this research and forethought has been successful, failure is almost certain unless the man in the ranks and his leaders have the determination to profit in full measure from the tactical doctrine laid down for them.

If the infantry still have a part to play in modern war, as they undoubtedly have, it is useful to examine what methods they should employ in order to get the best results.

TACTICAL METHODS

THE DEFENCE

In considering tactical methods it will be simpler in the first place to disregard the effect of atomic weapons and then to gauge how these weapons are likely to influence tactics. As has already been suggested, it is probable that eventually antidotes will be found which will at least diminish atomic power and that it would be foolish to discard a tactical doctrine, which has been built on war experience, just because at the moment an apparently dominating factor has arisen.

British infantry have earned a well-deserved reputation for themselves in defence due to the tenacity with which they have clung to positions and endured attack by greatly superior forces: Waterloo, Inkerman, Mons, and Le Cateau provide some examples. In all of these battles infantry fought shoulder to shoulder or at least in line and so were able to feel a certain sense of solidity and security from actual or near contact with their fellows. It has, however, been found by experience that such linear defence is inclined to be too brittle for modern conditions of warfare when the attacker is able to concentrate such preponderating power to punch a hole where he chooses. Once a line has been pierced it is not difficult to widen the breach without much delay, for it takes time for the defence to organise resistance on the flanks of the gap. The only sure way in which the line can be restored is by counter attack, but this is well nigh impossible to arrange until the situation has been stabilised: in fact the probability is that the breach will be expanded faster than the defence can reorganise. For these reasons linear defence has been superseded as a general rule by a system of localities, each of which is prepared for all round defence. Undoubtedly a position organised into localties provides the best means of absorbing an attack, but when it is a case of holding a coast, a river or other natural obstacle there are still advantages in a more linear type of defence for the front edge of the position. Even in such conditions when infantry are strung along an obstacle, although the line may not be continuous, there should still be localities disposed in depth further back. Unless there is an obstacle which confers such obvious advantages on the defence a system of strongly held localities is always to be preferred. What must be avoided is a form of compromise in the shape of a chain of very small posts designed to avoid the disadvantages of linear defence and yet retain the advantages of a system of localities. Each little post is liable to be a shell trap, has little power of protracted resistance, and will usually have to be under the command of a junior leader: a series of such posts is harder for a responsible officer to control even than an extended line. Although localities have to be large it is difficult to determine the ideal size. Much will depend on the ground and on the total number of troops available. There are solid advantages in arranging that each locality should be garrisoned by a whole battalion: then the tremendous asset of esprit de corps is given its fullest effect; a recent example is that of the stand of the Glosters in Korea. A similar advantage accrues in the case of a Territorial infantry brigade, which by virtue of its permanent constitution inevitably has greater esprit de corps than a Regular brigade which seldom keeps the same battalions for long in peace time; the prolonged resistance of the 150th Brigade locality at Gazala in North Africa in 1942 is a case in point.

If an area is defended by these large localities disposed in depth there are inevitably wide gaps between which the enemy can infiltrate without much difficulty. Commanders are apt to be perturbed at leaving so much ground undefended and the troops are prone to feel unhappy and unsettled when they know that the enemy has penetrated behind them. Once, however, infantry become accustomed to the idea it will be realised that infiltration is not really such a serious threat to the defence as it may appear. Attackers who have succeeded in threading their way between defended localities may have a superficial feeling of success, but there must also be a suspicion akin to the fly being ushered into the spider's parlour: it seems all too easy. Moreover in the course of their ramblings within the defended position they are certain to lose cohesion and are in consequence ill prepared to cope with even the most haphazard counter attack. Such a counter attack will have the pivotal support of the defended localities and should not be difficult to plan or to execute. The best time to deliver this counter stroke is at dusk when, even if complete success is not obtained, the confusion of the enemy in the growing darkness will be still worse confounded. On May 27, 1940, the 5th British Division holding the line of the Ypres–Comines Canal was subjected to attack by a German corps and the enemy succeeded in penetrating into the thinly held position, particularly near Comines. Failure to hold the position would have made the withdrawal of the British Expeditionary Force to Dunkirk impossible. At 7 p.m. two battalions which did not belong to the 5th Division arrived to reinforce. They were put in to counter attack in the Comines area at dusk, on a broad front and over ground which they had never seen and without time for reconnaissance. Theoretically, according to the text books of that time, an immediate counter attack such as this by anything larger than a company was condemned as too risky: moreover even in the case of a company counter attack it was expected that the ground would have been previously reconnoitred. In spite of being theoretically unsound the counter attack, or forward sweep as it really was, by these two battalions proved a complete success. There were during this battle several other counter attacks, although on a smaller scale. The result of this active defence was that the enemy seemed unable on May 28 to stage any further attacks similar in intensity to their original one: in fact on that evening their forward troops were withdrawn, presumably to regroup. The lesson which was abundantly clear to those who took part in this battle was that penetration between and beyond defended posts is not a very serious matter, always provided that there are sufficient reserves available to restore the situation.

A more dangerous form of infiltration occurs when some of the forward localities have been overwhelmed and penetration has been effected on a sufficiently broad front to suggest further possibilities to the attackers. Provided the localities flanking the breach continue to hold firm the commander of the attacking force is faced with an awkward problem: he may be tempted to try and continue right through and beyond the defended area, leaving a constant menace to his communications from flank attack, or he may feel compelled to turn outwards so as to expand the breach prior to any forward move. The deciding factor will usually be the extent of the original breach. This was the problem which confronted Rommel at the battle of Alam el Halfa in North Africa in 1942. There comparatively close was the ultimate objective of Cairo, so tempting once he had made a successful break into General Montgomery's position and yet this break was on too narrow a front for him to leave an unbeaten enemy on his left flank. Rightly Rommel concluded that he must first widen the breach: his attempt to do this failed with such heavy loss that there was no alternative but to withdraw. Although General Montgomery did not feel in a position to launch a counter offensive immediately, it was as a result of his successful defence that he was able to embark on his victorious offensive at El Alamein.

A purely passive defence could at one time lead to a condition of stalemate, but the advent of the tank virtually put an end to this possibility. Passive defence can delay the enemy but, without some form of counter attack, it is likely to be only a matter of time before the position is engulfed. The Maginot line of forts proved to be a failure without the reserves available to use these forts as pivots on which to base counter action. Once the line had been pierced the forts had little more than nuisance value and the stout-hearted way in which garrisons fought on had no effect on the campaign as a whole. Again in 1940 General Weygand was incensed at the withdrawal of the British garrison from Arras as he had hoped to use the town as a bastion on which to base an effort to close the great breach that had been torn in the allied front. It is true that Arras could have been held for two or three more days, but, although there may have been enough troops on paper to make a large scale counter offensive, there was not in fact a large enough force available and fit to fight. The continued passive defence of Arras by British infantry would have further delayed the enemy's main plan, for Arras is a great road centre, but the garrison was used to better purpose later and in an even more vital area. For a long time the defence of the country against invasion was almost entirely dependent on being able to halt the enemy on the beaches. It is of course a great temptation to take full advantage of the difficulties which must confront an invader at the moment of disembarcation, but a long coast line needs so much infantry for its close defence that it is difficult to find in addition sufficient reserves for counter attack. Eventually the policy was changed and the coast line was more thinly held thus making available strategical and tactical reserves. It is of interest to consider what the effect on our landings in Normandy might have been if Rommel had decided to hold the beaches more lightly and if he had been able to counter attack during that difficult period when the bridgehead was in process of being formed: as it was he adhered to a passive defence tactically, and strategic reserves were allotted for his use too late.

An expression crept into British text books between the two great wars to the effect that infantry in defence must hold out to the last man or the last round. Although at this period lip service was paid to a policy of defended localities, the defence as practised at training was mainly linear and the same remark also applies to the fighting in France in 1940. Under such circumstances the idea of men fighting on till all were casualties or there was no ammunition left is scarcely credible in the harsh reality of battle. Every experienced commander knows that when subjected to constant and heavy attack there is a gradual drifting away to the rear provided such an avenue of escape is open: it is true that the majority will stick it out but their difficulties will be increased as a result of diminished strength. Again the expression is not infrequently used that infantry have been driven in; this of course cannot happen if they are prepared to fight to the last. If, however, localities are genuinely prepared for all-round defence, the obvious line of withdrawal is towards the centre of a locality and this is unlikely to present any attraction to even the most faint hearted. Thus apart from its other advantages a defensive system based on localities is likely to lead to more tenacious resistance.

The disposition, then, of infantry in defence must be in large localities prepared to meet simultaneous attack from every angle. The larger the localities and the more they are échelonned in depth, the wider will be the gaps between them. It is desirable that these gaps should be covered by fire from one or more localities but even this may not be possible, as in war there are usually less troops available than a defensive position actually needs. Large localities must be composed of sub-localities, otherwise if only one extended perimeter is held it becomes itself a form of linear defence. The policy of holding a linear front dies hard: it is possible that when defending a broad river or a coast line, some degree of compromise is desirable, but in rear of any linear defence there must also be a system of localities. Every defended locality is surrounded by "No Man's Land" and on this ground the artillery of the defence should be at liberty to fire, although in old-fashioned terminology it may be said to be firing behind its own infantry. Above all it is imperative that in planning this type of area defence enough troops should have been economised to allow counter attacks to be launched with a reasonable hope of success.

THE ATTACK

It has taken a very long time for the lesson to be learnt that infantry cannot be expected to attack in daylight over open ground in face of a determined and unshaken defence. Usually such attacks have been directed against key positions which are the most likely to be strongly defended. There have been too many examples of fresh infantry being ordered to attack a position where others have already failed and without sufficient extra support to make success more likely. Sometimes commanders have been so lacking in imagination and commonsense as to call upon infantry, who have previously failed, to make a second attempt: nothing can be achieved by such means and the only result will be to lower the fighting value of the battalions concerned for a long time.

Every type of formation and minor tactics have been tried to enable infantry to advance over open ground without suffering too great loss. Close formations were superseded by extended order and although there were fewer casualties control became much more difficult. Prior to 1914 the approved policy was to build up a firing line in close proximity to the enemy as a result of a closing up of successive waves on the foremost line of infantry: it was expected that superiority of fire would then be obtained and thus pave the way for the final assault. It is difficult to understand why it was ever supposed that infantry lying in the open could hope to make their fire superior to defenders occupying prepared positions. When in the 1914–18 war it was at last realised that infantry could not expect to succeed in this way it was decided that reliance must be placed on artillery fire to crush the defence and only then to move the infantry forward to occupy the ground which the guns had won for them. The introduction of the tank provided an alternative method whereby the infantry had little to do but to take over a position after its capture. The lowest ebb of infantry tactics was reached at this period but it was followed by a feeling of revolt that infantry, which had always been considered to be the predominant arm in battle, should have fallen to such a humble position. Moreover it was realised that the number of shells needed to pulverise a position could not always be made available, particularly in open warfare, nor could tanks always be counted upon to lead the infantry forward to victory. Consequently plans for fire and movement were evolved to enable the infantry to make progress by the use of their own resources. The two light machine gun sections in each platoon were to provide the fire necessary to allow the rifle sections to advance by using any available cover or by short rushes across the open. At a later date these minor tactics were simplified into what is known as Battle Drill. Although this Battle Drill may be rather too stereotyped for the unpredictable conditions of war, on the whole it is probably advantageous to have prepared and practised elementary forms of manœuvre for dealing with the more likely problems which may confront the junior leader. If there are patches of close country in front of a defended position there is a reasonable chance of attacking infantry getting to close quarters with the enemy by using the method of fire and movement. Again, when operations are still fluid, in fact when there is no question of an attack on a prepared position, it is also possible for infantry to make progress so to speak under their own steam. However against an organised defence, which would be expected to include an adequate field of fire, infantry can have little hope of success by attacking in daylight unless given such a degree of support from artillery or tanks as to reduce the enemy's fire to negligible proportions. This is not to say that even then infantry cannot do something to help themselves forward by fire and movement, but the deciding factor will always be the amount of outside support available. It is almost impossible to emphasise this point too strongly, for infantry have so often been wasted on hopeless enterprises and with the introduction of automatic rifles, which will favour the defence more than the attack, the case against attacking an unshaken defence in broad daylight is even more weighty.

It is curious how there has been an unwillingness to run the risks of night attacks. For a long time the disaster suffered by the Highland Brigade at Maggersfontein during the Boer war at the beginning of the century seems to have deterred British commanders from attempting night operations, although since then there have been more and incomparably worse disasters as the result of attacks made in broad daylight. Although armies were living in the open for years during the 1914–18 war and thus a most unusual night sense had been acquired by all ranks, comparatively little advantage was taken of this asset. Almost every night attack that was attempted proved successful and yet costly attacks by day were still preferred. Between the two great wars there was little encouragement in the training manuals to give preference to attacks by night over those by day. Such an elaborate technique for staging a night attack was laid down as to be quite unsuited to the conditions likely to be found on the battlefield. Even as late as 1944 the principal school in England for teaching infantry tactics was found to be advising such a complicated procedure as to be entirely at variance with the circumstances of active service. Of course direction may be lost at night, confusion may arise which it is difficult to straighten out in the dark, unexpected obstacles may be encountered and disaster may ensue, but the risks of attacking over the open in daylight are surely the greater. There is much to be said in favour of attacks by moonlight or for an approach by night followed by an assault at dawn, but it is noteworthy that attacks at dusk, particularly short range attacks have usually been successful.

Soon after the first world war there was evolved one of those tactical novelties which are apt to become fashionable in peace time but which seldom stand the test of war. This particular one was known as "Soft Spot" tactics. It was an unfortunate name as it tended to convey the impression that there might well be a way open to easy success if only it could be found. The underlying idea was to probe the enemy's position until the softer spots were disclosed and then to concentrate every effort against these weak places. Such a policy was undoubtedly based on a revulsion of feeling against the tragic frontal attacks on key positions to which reference has already been made. It is of course true that every defended position has areas which are less easy to hold than others, usually due to the fact that the nature of the ground favours the attack more than elsewhere. In a well-organised defence, however, there will be no spots that can be accurately described as soft: hard and probably prolonged fighting will nearly always be needed in order to effect a successful lodgment within the position. In the days of linear defence with its hard and continuous outer crust there was little chance of discovering an apparently weak spot. In an attack, however, against a more modern type of defensive organisation it will not be difficult to find inviting avenues for penetration between widely spaced localities. Infiltration by this means into the heart of a position would appear to be most encouraging to the attacker at first but then the difficulty arises as to what to do next. The protagonists of "Soft Spot" tactics assumed that after the initial breach the attack would proceed like an expanding torrent, but today an advance between localities would be more akin to a sluggish stream meandering forward and avoiding all snags and boulders. To act in this way leaves the enemy undefeated and does not even prepare the way for victory: sooner or later the first superficial success will peter out and nothing of value will have been achieved.

When selecting the area for the main thrust against a position organised on modern lines one of the factors in coming to a decision will be the apparent weakness of some of the enemy's forward localities. The front chosen for attack, however, must be sufficiently broad, for attempts to penetrate a deep zone on a narrow front must invite disaster. It is extremely unlikely that all the localities on the front selected will be in any degree soft, the majority will need a great deal of hard fighting before they can be captured.

Although it is suggested that the enemy's forward localities can best be attacked under cover of darkness, the question then arises as to how best to deal with the other localities further in rear. Although there are obvious advantages in continuing the attack whilst the enemy is still suffering from the shock of his initial set back, it may be too risky to attempt to do so without that further ground reconnaissance which will only become possible after the capture of the forward localities; this is particularly true in a well organised position. Furthermore, it may well be necessary to pass fresh formations through those which made the original assault; this manœuvre takes time and will be slower still if, as is often the case, the first attack was not completely successful everywhere. A balance has to be struck between these conflicting factors: against a very strong position it may be wise to attempt nothing more ambitious than slow and methodical progress spread perhaps over a period of days. In the time of linear defence the "Break In" was usually more difficult than the "Break Through," but when dealing with localities organised in depth the reverse may often be the case: this is an added argument in favour of proceeding only step by step. Unless the original breach was on a really broad front attempts to penetrate further into a deep defensive zone will be harder still. Whilst this fact has generally been appreciated in the past, sufficient attention has not always been given to the amount of support available for an attack on a broad front and yet this must be the first consideration. It may, therefore, often be necessary to make the first attack on a front only just broad enough so as to allow of overwhelming support and later to make a second and parallel attack before making any attempt to deepen the breach. There are disadvantages in taking two bites at the cherry in this way but it may frequently prove to be the safer method. It is unlikely that there will be enough tanks available to carry the infantry right through a deeply defended zone: if it is expected that the toughest resistance will be met from rearward localities rather than in breaking the crust, then such tanks as are available should be reserved for this purpose. Moreover the forward anti-tank defence is likely to be the more dangerous, for after a jagged rent has been torn in the position the rearward anti-tank lay-out is sure to be partially disorganised: some of it in fact will have to be hastily improvised. One can, therefore, picture the attack against a position defended on modern lines being made somewhat as follows: the "Break In" will usually be attempted by night on as broad a front as can be adequately supported; the "Break Through" will often depend mainly on tanks and will be launched only after a sufficient delay for reconnaissance and for a leapfrog through of new infantry formations as soon as the "Break In" has been tidied up; the final "Break Out" can in favourable circumstances be facilitated by airborne infantry.

The decision as to whether airborne infantry can play a useful part in the attack on the rearward edge of a deeply defended zone depends on the adequacy of the supporting weapons which can be dropped with them and the degree of resistance likely to be met. At the present moment it is doubtful if airborne infantry can be given sufficient resources to warrant an attack on well defended localities, although the time may come when this will no longer be the case. Until that day arrives it may be better to drop them well in rear of the defended zone with the object of disrupting communications and attacking headquarters and those installations needed to sustain a battle front. The timing of the drop is important, for not only must airborne infantry bring maximum assistance to the main attack but there must not be undue delay before a junction between the two is effected: in fact there must be one connected battle. As circumstances existed there was little hope of the second British Army being able to join forces with the airborne forces in and around Arnhem. It is possible that during the landings on the coast of Normandy airborne troops may have been dropped rather too far back: it is true that a junction between the forces landed from sea and air was eventually effected but it was at one time in doubt as to whether this could be achieved. Of course if air landings had been made further forward the resistance encountered might have been too much for them. When the 21st Army Group crossed the Rhine in 1945 there was never any reasonable doubt that they could make contact sufficiently quickly with the airborne troops which had been dropped on the further bank.

Having dealt with the broad picture of an attack on a defended zone the more detailed aspects of an attack on a locality will now be considered. It must be assumed that a large locality will consist of several sub-localities which will be mutually supporting and that, therefore, attacks from the flanks or rear will have no greater chance of success than frontal attacks. In certain conditions some form of concentric attack may be possible, but as a rule it will be better to make the main thrust from the front where it will be easier to arrange an accurate programme of supporting fire. The object of the supporting arms, whether artillery, air bombardment or tanks or a combination of two or all three of these, is to enable the infantry to break into a locality: thereafter the overcoming of resistance within the locality can normally be left to the infantry through weight of numbers and by the use of their own weapons. Supporting arms can best attain their object by neutralising the fire of the defence, and this will only be possible if there is great accuracy of fire. Air bombardment can have devastating effect but it is doubtful whether it can yet be sufficiently accurate for the close support of attacking infantry on a timed programme; it is true that infantry can now call for and get air strikes for dealing with special points of enemy resistance, but for the general support of a deliberately planned attack artillery fire is probably still the more effective. On the whole the infantry will usually prefer the support of tanks to any other. Not only can tanks give them general support, but they can crush wire and deal quickly with centres of resistance, some of which may be unexpected.

It is sheer waste to use cruiser type tanks for an assault on a prepared position. They are neither heavily armoured enough to withstand punishment nor sufficiently fast or mobile to avoid it. At the battle of El Alamein cruiser tanks were used and suffered heavily from the German 88-mm. guns: if it had been possible to keep more of them in reserve so as to exploit victory it is probable that the Africa Corps would have suffered immediate and complete disaster. There were of course no infantry tanks available at that time and so it was a case of using cruiser tanks or none. It is at least possible that anti-tank guns will develop in hitting power to such an extent that it will not be practicable to give the infantry tank heavy enough armour to enable it to survive. In this case it may be necessary to use very fast and light tanks in considerable numbers which will avoid loss by sheer speed and by swerving. The task then for infantry to co-operate successfully with tanks will be even harder than it is now: either the tanks will reach the enemy's position far ahead of the infantry or the latter will have to fight their way forward until the tanks catch them up almost at the last moment. It is conceivable that the day may come when infantry will be taken forward in armoured and tracked vehicles in close proximity to their supporting tanks, and will only emerge from their vehicles when the position is actually reached.

In this discussion of infantry in the attack various methods have been mentioned whereby each stage of the breaching of a powerfully defended position may be achieved. It is not a matter of great difficulty to plan each stage including the necessary programmes for support by air, artillery, and tanks, but in spite of the most careful planning it is unlikely that any stage of the attack will meet with complete success. It is nearly always when the infantry have to improvise so as to overcome the enemy's final resistance that the heaviest losses are suffered. Even by using their own mortars or by calling for assistance from the air, from tanks, or artillery, the complete mopping up of defended posts may be arduous and slow. It behoves higher commanders not to base the plan for any stage of the attack on the assumption that the previous stage will be an entire success. In fact, it is only when plans for successive stages are sufficiently flexible that an attack can be expected to proceed with some measure of smoothness from beginning to end.

Infantry Weapons and Equipment

Although the infantry require a great number of different weapons to enable them to perform their various tasks in modern war, only some of these need be included in the armament of a battalion, whereas others can be used to better purpose by supporting it from outside. The point is well illustrated by the story of the Vickers machine gun. In 1914 there were two of this type of gun in each battalion and on several occasions during that difficult year they were invaluable in a crisis. Yet later it was decided that the power of concentrated machine gun fire was such that only by collecting them into special battalions could the best value be got from them. It was hoped that the Lewis gun would be a reasonable substitute in the ordinary battalion, but this it never was. There were many occasions in 1917 and 1918 when machine-gun battalions did valuable work, but at the time the policy did not seem to be justified. Thereafter and until a few years before the second world war machine guns were handed back to the ordinary infantry battalions although by way of a compromise a brigade machine-gun officer was appointed who could concentrate all the guns of a brigade for a specific purpose. By 1940 machine guns were back again in special battalions, but there were few senior commanders who did not complain that, as a result of their experience during the fighting in France, this was a mistake. Although it seemed advisable not to make a change during the war it was made soon afterwards. This apparent wavering between one policy and another is indicative of the fact that the machine gun constitutes a border line case. When making a decision as to whether a type of weapon should be decentralised to battalions or centralised elsewhere there are various factors to be considered. First, there is the problem as to whether the weapon is better used in large numbers so as to get the best results; once weapons have been allotted to battalions it is unsatisfactory to collect them for a special purpose, as the personnel concerned may not give of their best when away from their unit; secondly, all weapons may be more stoutly served by soldiers of an infantry battalion where *esprit de corps* is high; lastly, there are some weapons which need a standard of skill in handling which may be beyond the scope of the infantry soldier. When striking a balance between these factors it would seem advantageous to make a battalion as self-contained as possible, in fact, a small formation rather than a unit: this appears to be the modern tendency and it will probably develop still further. If the battalion of today be compared with that of 1914 this radical change becomes apparent: then there was only the rifle and bayonet and two machine guns; now there are automatic weapons for long and short ranges, including automatic rifles, there are mortars, grenades, and anti-tank weapons which will certainly be improved still further. The only other normal support needed by the infantry is artillery and tanks; already mortars provide short-range artillery and perhaps one day some form of infantry tank may be incorporated within a battalion.

The mechanisation of infantry transport has been a great administrative convenience but, apart from vehicles fitted with tracks, it has not added materially to the fighting efficiency of a battalion. When, however, infantry are being moved considerable distances by mechanical transport the fact that their own vehicles can keep pace is a real advantage. For the purpose of transporting infantry in this way it is clearly more economical to allot lorries from a central pool, on the other hand there are seldom enough lorries available at short notice when a sudden call is made. The speed of modern war has increased to such an extent that a marching pace of three miles per hour is an anachronism. The day must surely come when every battalion is made strategically mobile with its own troop carriers. If these carriers are supplied with tracks as well as wheels and are also lightly armoured they can then be used tactically to good purpose on the actual battlefield. If eventually infantry divisions are made fully mobile in this way, the difference between them and armoured divisions will become less. The outcome may well be that there will be heavy divisions with a high proportion of infantry and artillery together with heavy tanks, and light divisions corresponding to the present armoured divisions: in addition there will of course be airborne divisions. It is realised that an army organised and equipped thus is not altogether suited for engaging in "Small Wars" against an uncivilised enemy, but it is becoming increasingly difficult to design an army for a dual purpose and it is scarcely open to argument that preparation for a great war must have priority.

The future employment of airborne infantry will be governed by the degree of support in artillery and tanks which can be given them. At present they have not the means for overcoming strong resistance; they cannot be expected, for instance, to capture a well defended post nor to act, as has already been explained, in close concert with ground troops in an attack on a position. It is likely that in time it will be possible to give them the support which they need, perhaps helicopters may provide the solution. The chief asset of airborne attack is surprise: once the defenders have withstood the first onslaught they have little to fear from troops which lack the necessary punch. In order to obtain quick results it is necessary that numbers should be fully adequate for the task: there has been a tendency to send a boy to do a man's job. Again, so as to avoid landing on unsuitable country a dropping zone has sometimes been chosen too far from the objective; it is possible that this was the case at Arnhem. The mobility of airborne troops is such that potentially they can be used far ahead of ground troops, but until they are sufficiently self-contained to be able to operate independently for days at a time their mobility is largely wasted. If the army as a whole is made more mobile, as has been suggested, the period during which airborne troops may be required to act by themselves will be reduced.

The Influence of Atomic Weapons on Infantry Tactics

Until some form of satisfactory antidote has been found it is clear that atomic power must be such an important factor that both strategy and tactics will be profoundly affected. It would appear that any dense concentration of troops, of transport or of installations will form such a vulnerable target that survival is unlikely. Dispersion and mobility would seem to be the best safeguards and these safeguards must be observed if infantry are to play a useful part in battles of the future.

It is apparent that any form of static defence, particularly in well defined localities, will be highly dangerous. This fact is so obvious that it has already been suggested that in future attackers will depend for success on blasting a passage in a defensive zone by atomic missiles, after which armoured divisions will pour through to exploit success. If this is to be the plan, then the defence must be so arranged as to minimise such a danger. The more passive the defence the greater the risk and so resistance must be as active and mobile as possible. As long as space is available a manœuvre battle may be the best method of protecting vital objectives, but sooner or later space will dwindle and the side which strategically is on the defensive will be forced to stand and fight. Once an army has to occupy a defensive position there are three main considerations which should govern the deployment of the troops. First, the actual position should be lightly held, otherwise the casualties in the area when the enemy decides to make his main thrust will be shattering. Secondly, reserves for counter attack should be strong, be well hidden, be far enough back to escape the initial atomic attack, and yet mobile enough to act quickly when needed. Thirdly, there should be an anti-tank obstacle behind the defensive zone, so that after the enemy has torn a rent in this zone with his atomic missiles his armoured troops cannot immediately seize the opportunity which has been made for them. This rather novel form of defensive plan must now be examined in more detail.

The first object must be to prevent the attack, by using ordinary pre-atomic methods, from brushing aside opposition. This object can only be accomplished by holding a sufficiency of defended posts. The continued survival of these posts will depend as much on counter attack as on the tenacity of their garrisons. It is presumed that attackers, once they have established close contact with the defence and find further progress difficult, will resort to atomic assault. Assuming that the garrisons in the area of atomic attack are wiped out, although this may not be inevitable, it is now necessary for the attackers to establish bridgeheads beyond the anti-tank obstacle before the armoured divisions can be unleashed. It would seem that at this point of the battle atomic advantage may well swing towards the defence. Infantry moving forward to establish bridgeheads will be confined by the anti-tank obstacle in front, and on the flanks by the posts of the original position, the garrisons of which should still be holding out. These infantry thus confined and partially static should themselves be a prey to atomic attack.

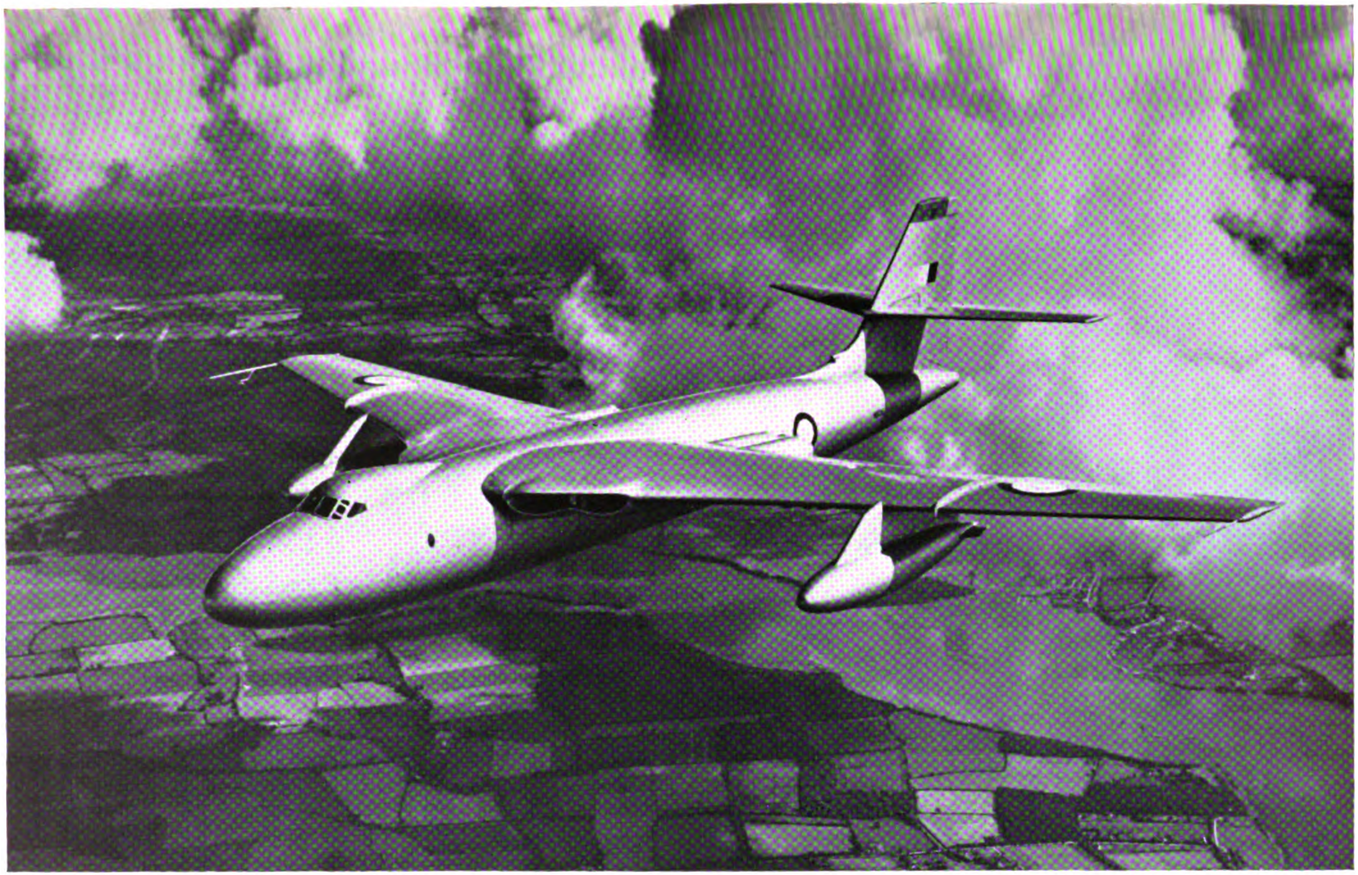
This picture only intends to portray a possible form of defence against an army using atomic weapons; but it serves to show that even so an attack will not necessarily be a smooth uninterrupted process and that during the pauses when the attack is temporarily halted there will be opportunities for atomic counter attack. It is of course possible that the attack will take advantage of the fact that the defence is widely dispersed with a view to meeting atomic bombardment and that these dispositions will be less well suited to meet an ordinary attack.

Theoretically this brief examination of the effect of atomic power on infantry tactics may be correct as far as it goes. It is difficult, however, to estimate the moral effect on those battalions dispersed even thinly in a defensive position and at the apparent mercy of atomic attack. Still more doubtful will be the fighting value of battalions which have already undergone such an experience. There is, however, a likelihood that no nation will for some time to come dispose of sufficient nuclear material to be able to use it on any but the most profitable targets. Dispersed infantry do not present a target comparable with the many installations which are vital to the needs of an army. Inevitably less accuracy in bombing will be needed and more telling results obtained by attacking these installations rather than the army itself.

MORALE

So far attention has been almost entirely concentrated on weapons, equipment, and the various tactical methods applicable to modern infantry. To whatever degree of perfection these may be developed it is the quality of the infantry as fighting soldiers, however, that will be the deciding factor between success and failure. Fortitude and self-reliance in the individual and discipline and *esprit de corps* in the battalion count for much more than skill with weapons, efficiency with equipment, or tactical ability. Similarly, dash and self-confidence are more valuable qualities for the junior leader than a high degree of military knowledge. Above all the excellence of British infantry has depended, and will surely continue to depend, on complete loyalty to the regiment. It can be argued that other arms of the service and other nations can achieve results with only a much wider form of loyalty: it can be proved that administrative difficulties over reinforcements in time of war make the working of the regimental system well nigh impossible: yet it still remains true that any action calculated to undermine this loyalty to the regiment, however plausible it may appear, is a blow at what has made British infantry incomparable.

H. E. FRANKLYN



Vickers Valiant, four Rolls-Royce Avon turbojets

CHAPTER V

THE ROLE OF THE BOMBER

By Wing-Commander C. N. Foxley-Norris

A NEW WEAPON—ITS USES AND ABUSES

War is a science. Like all sciences it knows two forms of progress. First, the most familiar, is the steady, plodding grind by which diligent and industrious men gradually develop their knowledge and techniques until finally they attain a definite and measurable degree of advance. Second, and most rare, is the revolutionary discovery which in itself and in a short time constitutes a giant stride forward in the concept of that science. The second type of discovery may be the result of prolonged research, and may itself require and be adaptable to much development and improvement, but its revelation makes a clearly identifiable step which changes the whole essence and philosophy of the subject with which it deals. Among such discoveries must be placed the bomber aircraft.

Every science moves in channels restricted by the mental powers of its practitioners and the capabilities of their equipment. These are two separate and distinct limitations, but very often the former is conditioned by the latter, and the fact that no machinery exists to exploit the full potentialities of a science not only restricts its development but also circumscribes the mental horizon of its scientists. This process is well exemplified in the history of war.

War is fought to make the enemy submit to one's will, whether to surrender his territory or his sovereignty, modify his policy, or whatever it may be. Thus the target of warfare is the will of the enemy people as reflected by their government. Physical attack on and occupation of enemy territory is the time-honoured method of procuring such submission. The advance to accomplish this has been necessarily by land or sea, since machines of war, including men, were confined to two dimensions; this advance was opposed by similarly two dimensional forces, and the essential preliminary to victory became the defeat of the enemy's land or sea forces. History offers some examples of other means of achieving final victory, e.g., by blockade and starvation, but these too were normally preceded by victory at sea or in the field. The practical target of operations of war thus became established as the enemy's forces: however, by an unwarrantable extension of thought, this target came to be accepted as, and so to obscure the basic aim of war, compulsion of the will of the enemy people. Generals, admirals, and military theorists inclined more and more to concentrate on the defeat of enemy forces as their target and to forget the only justification for attack on them, that they blocked the way to the real objective.

There was little danger in this confusion of thought, as long as defeat of the enemy forces remained the only practical means of attaining the higher aim. Clearly, however, it would become dangerous if a weapon could be devised which enabled the delivery of a lethal attack on the enemy's vitals without engagement with his armed forces. If the enemy's strongest point, his armed forces, could be by-passed and a weaker point for attack selected, clearly such an attack should prove quicker in its effect and less costly in its accomplishment. The development of the bomber produced the weapon which at any rate in theory could launch such an attack. Theory is, however, often difficult to establish by fact or experience, and disputes arise unless definite factual proof can be adduced; and, in the case of the bomber, it cannot, or at least such proof is open to debate.

The bombers of World War I were at too embryonic a stage of development to enable anything more than intelligent guesses to be made as to their potential capabilities, and in the interwar years progress in both the practice and theory of their use was slow and hesitant. World War II lent new impetus, and great improvements were made in the size, range, performance, and load of bombers. They rose to the acknowledged position of the major offensive weapon of war, but their achievements in that role were not such as to offer decisive and indisputable evidence as to their proper future employment. Many and various opinions, at all levels of thought and authority, have been expressed on this subject, and the conclusions reached differ widely. It may prove constructive to assess those of the extreme schools of opposing theorists, in the expectation that the correct answer may lie somewhere between them.

EXTREMISTS—THE SEVERSKY SCHOOL

The extreme protagonists of the "pure" bomber school, of which the prophet and presiding deity is Alexander de Seversky, argue that the bomber, is per se, a war-winning weapon. Its outstanding and unique characteristic is its ability to by-pass the enemy's strongest point, his armed forces, and attack his weakest point, those elements of his structure that are not trained or acclimatised, or adequately camouflaged or protected against such attack. Spiritually and physically, armed forces may be rendered comparatively immune to air attack; their morale is high and they may be protected by armour, fortification, terrain, and concealment, as well as by the more active means of defence, which can be concentrated over their comparatively small locations. By contrast, the morale of the civilian population, the industrial workers and the administrators, is not inured to the hardships of war, and the material structures, factories, communications, civilian and military supply network are equally vulnerable and by their natural dispersion present a heavier defence commitment. It follows that air attack should be confined to this class of target for two reasons, firstly because of their inherent weakness compared to armed forces, secondly because the difficulty of providing comprehensive active defence for them will render such attacks less expensive.

A third reason is adduced to clinch the argument. The aim of war is to impose one's will on the enemy, i.e., his government representing his people. Attacks actually directed physically against that government and people are thus more likely to attain that aim quickly and effectively. By contrast, air attack against armed forces has only an indirect effect on the decision of governments. The classic example drawn is that of the Japanese who, it is argued, surrendered as a result of an inexpensive and direct attack on their vital centres, while their armed forces remained largely undefeated and could only have been overcome at vast expense of men, material, and time.

The counter theory, that bombers should, like any other weapon, be used in support of one's own armed forces and more or less directly against those of the enemy, is derided as a wanton misapplication of the weapon of the future to the tactics of the past. The bomber can in one hour pierce the enemy defences farther than can most armies in a year; it is therefore absurd to harness its speed and penetration to that of the crawling soldiery, and those who seek to do so would handicap the bomber unjustifiably and intolerably.

The advocate of such misuse is likened to a gallant who wooed a maiden living in a high tower. To visit her he would first have to fight the night watchman on the door, subdue him and so force an entry. On arrival, the suitor observes that a careless steeplejack has left a rope and pulley on the battlements. All that he needs to do is fasten one end of the rope to a fixture and climb the other to the maiden's casement, thus by-passing the watchman's defences. The gallant, however, all uncomprehending hauls down the rope entire, proceeds to the front door, awakes the night watchman, and attempts to garrot him with the rope. Furthermore the struggle so exhausts him that thereafter he abandons his mission and goes home to bed, leaving the maiden maidenly. The moral of the story is either "maintain the aim" or "just because birds have legs, it doesn't mean they have to walk everywhere."

EXTREMISTS—THE SUPPORT SCHOOL

The aim of war is not in dispute between the two schools of military theorists we are considering, and even the extremists of the second school concede that if it could be attained without direct attack on the enemy armed forces, so much the better. They do not contest that the aim is a quick and inexpensive decision. What they do contest is that such a decision can be practicably reached except by the actual defeat of the enemy's forces. As a result they contend that the correct use of air power, including bombers, is as one of many weapons directly contributing to such defeat.

The foremost military minds of many great powers have been advocates of this school. To the German, the traditional arbiter of military theory, the correct conception of modern warfare, as illustrated early in World War II, was one of violent, sudden advance on land, smashing by concentration the dispersed forces of the enemy, employing initiative and surprise to compensate for overall parity, or even inferiority, of forces. For this concept, the blitzkrieg, air power was an essential component in the general armoury of offence, and in fact its primary attribute, flexbility, contributing to surprise and maximum concentration, made it the ideal weapon for such a purpose. As a result the Luftwaffe was born, developed, and attained its greatest strength and repute as an ancillary and forerunner to the advance of armoured land forces.

For a time the course of events appeared to provide empirical proof of the correctness of this conception. Further it may be argued that what appeared to refute it, the final failure and defeat of the Luftwaffe, was in fact due to outside circumstances rather than any theoretical fundamental error. The existence of the natural barrier of the English Channel, and the failure of the German staff to budget and supply adequately for the full requirements, including those of the Luftwaffe, for final and decisive success may be blamed for the failure of the land/air blitz to reach its logical culmination in complete victory.

The attractions at least of such thinking are reflected in the fact that another great military power, Russia, followed slavishly in German footsteps, and established and directed her air forces in World War II almost exclusively in the role of an ancillary arm to her ground forces. Her grand strategy was based on hedgehog defence, followed by steamroller advance, and the appointed role of the air force was to provide air superiority and close support for the first, and short and long range artillery to clear the path of the second. Strategic bombing, as conceived by the R.A.F. and U.S.A.F., played practically no part in the Russians' operations and such medium bombers as they had were used largely in attacks on the enemy's tactical back areas, i.e., still in the role of more or less direct support to the army.

Further fuel for this particular theoretical fire is added by the fact that Russian studies of campaigns and the use of air power in the last war do not appear to have produced any major alteration in their conception of the correct use of air forces. Although they are developing their medium bomber force to a considerably greater extent than previously, it remains comparatively a small proportion of their total air forces. If such a numerical ratio may be relied on as a guide, the large part of their resources devoted to tactical aircraft indicates that their military leaders, who have proved themselves no fools, still envisage air forces largely as long-range artillery, a supporting arm for the land forces. Furthermore, the subordination of the air force to the army at the highest level of the Services hierarchy lends further weight to this view.

The advocates of the support school thus have some strong testimony to call on their side. A major counter-argument, however, still faces them in the form of the great achievements of the R.A.F. and the U.S.A.F. in World War II, when our bombers were used very largely in the pure strategic role, i.e., against enemy industry, communications, resources and morale, and only occasionally in direct support of the sister services. This bomber offensive undeniably paved the way, cut the losses, and accelerated the success of our final offensive; how then can it be represented as ill-conceived?

The support school meets this argument by admitting the successes of the bombers, but claiming that they would have been even more striking had the support given to our offensive been more direct and closely linked with the operations of the other services. They accuse the air forces of fighting an unjustifiably private war, failing to maintain the common aim, and, by division of effort, deferring the advent of final success. They claim, as did a recent eminent naval contributor to the R.U.S.I. journal, that the success of support operations, e.g., for the army in the cutting of communications prior to Overlord and for the navy in countering the U-boat, proves that this is the true role of the bomber, and that had it been accepted as such our reverses in the last war would have been less heavy and our successes more decisive and speedy.

A COMPROMISE BETWEEN EXTREMES

As always the right answer may well lie between the extremes, and, if so, will rest on the ground common to both. As we have seen this common ground consists of two assumptions; the first is that the aim of war is to suborn the will of the enemy; the second is that ideally this aim could be attained more quickly and cheaply by attacking targets other than armed forces because of the natural strength of the latter. The basic difference concerns the question of whether in practice the aim can be attained by attack on such targets.

The support school claim that the empirical evidence is on their side; that the failure of the vast Anglo-American bomber effort to win an outright victory in World War II and the need to fall back on the traditional clinching blow of land invasion demonstrate that strategic bombing alone is incapable of eliminating a major power from a war.

This argument, however, is based on two fallacies. The first is that the amount of effort put into the bombing offensive was in fact vast, in relation, that is to say, to the total national effort. American figures are not available, but those for the R.A.F. prove that it was not so. The proportion of the total national effort devoted to the R.A.F. was a mere 27 per cent., of which Bomber Command absorbed less than 30 per cent., or a total of about 7 per cent. of the whole national effort. By no stretch of imagination can this be described as a relatively large share, or such as would have been made available had the intention existed to win the war outright by bombing alone. Of course such intention did not exist, and therein lies the second fallacy of the case under consideration.

The target systems ordained for Bomber Command varied considerably with the circumstances of war, but the overall aim of its offensive can best be summed up in the words of the Casablanca directive for the Anglo-American bomber force, "the progressive destruction and dislocation of the German military, industrial and economic system and the undermining of the morale of the German people to a point where their capacity for armed resistance is fatally weakened." Note the last two words—not "destroyed" or "eliminated," but "fatally weakened." It is clear that there was no intention in the minds of our planners to defeat Germany by bombing but merely to ready her, by heavy punching to the body, for the final knock-out blow in the traditional manner, i.e., by land invasion. The fact that the directing authorities did not regard the bomber offensive as an exclusive campaign is demonstrated by their willingness, throughout the war, to direct it to the support, direct or indirect, of the other arms, when the need was genuinely compelling. Examples are too numerous to list comprehensively but we may quote support in the war at sea by the bombing of the 1940 invasion ports, by the diversion of bomber squadrons to the anti-submarine role, by the heavy and continuous sea-mining commitment, by attacks on major German war vessels, and by the priority given to submarine assembly plants and component factories in the target programme; in the land battle, in North Africa, against Rommel's ports and shipping, dumps and communications, in Italy against strong points and communications, and in direct and indirect support before, during and after Overlord. No one who was at Monte Cassino, at Caen, or at Wesel will claim that the bombers were fighting an independent and isolated war to try and defeat Germany by their own unaided efforts.

Here, however, we seem to encounter a paradox, in that, by showing the fallacy of the argument of the support school that bombing alone did not win the war, we seem to agree by implication their general verdict that bombing could not do so. In demonstrating that there was no intention of eliminating Germany by bombing alone, we lay ourselves open to the riposte "And why not? Because it is not possible for bombers alone to knock out a major power—therefore they must co-operate directly with the other services in a traditional combined assault."

Here again, however, is a fallacy. It is a non-sequitur to argue that, because bombers did not finish the war outright by attack on strategic targets, therefore the selection of targets was wrong. The effect of a punch depends on two factors, the selection of the target and the weight of the punch. It is equally tenable that the right targets were chosen but the requisite hitting power was lacking; and that even so the blows dealt those targets were far more effective in bringing the war to a quick and inexpensive close than any attacks more directly in support of other operations could have been. Furthermore, it would be equally fallacious to argue that, because in the past available hitting power proved inadequate to secure decisive victory by attack on certain types of target, that it must remain so inadequate in the future; one might just as well argue that, because a lion-cub can only do mischievous damage, that a fully-grown lion is an ideal household pet.

Sufficient has been said to prove that logic will not attest the theories of the support school. It may perhaps therefore seem unnecessary to show that neither does experience but we may take note that even the arguments applied to Germany bear no reference to the case of Japan. The opposing school of thought will claim that the first two atomic bombs exploded the theories of the support school, and proved those of Seversky. It is still, however, arguable that even this proof was not conclusive, on the grounds that only a nation, whose morale was already shaken by the defeats inflicted on its armed forces, succumbed directly to bombing attack. It has been claimed that after the victories of the allied armies and navies the Japanese government was already seeking a face-saving excuse for capitulation, and that the bombing, far from being individually decisive, was only the culmination of a series of conventional victories already almost complete.

Thus even in the instance of Japan the case for strategic bombing lacks indisputable empirical proof. What common final thesis can then be deduced as beyond dispute? That the subjection of the enemy's will is the aim of war; that bombing of strategic targets rather than armed forces could theoretically secure quick and inexpensive victory: and that in the past such bombing has not proved a sufficiently potent weapon to attain, or even to try to attain, that victory without the assistance of more traditional forms of attack by the other services.

So much for the present. What evidence is there by which we can apply or modify its lessons to the future? Are we justified by any increase in potential hitting power in accepting Seversky's doctrines for the future role of bomber forces even though they may not have been wholly confirmed in the past?

THE FUTURE ROLE OF THE BOMBER

In considering any potential increase in the power of the bomber, we should remember that hitting power can never logically be assessed in vacuo, but constructively only when applied to a given target. Hitting power, that is, can only be properly estimated objectively, and depends on two factors, the actual weight of the blow and the relative vulnerability of the target. A blow lethal to a mouse may not even be felt by a tortoise; again, a blow that kills a single ant may be unnoticed by the colony as a whole. Hitting power must be related to what is hit. Strategic bombing must be considered with the target system of a stated opponent in mind.

The aim of the bomber commander, as of all other commanders, must be to penetrate the enemy's defences and hit him hard where it hurts most. The bomber commander now has to his hand, in the form of nuclear missiles, actual weapons infinitely more destructive than anything previously used in war. We are told that the atom bomb of 1945 carried the destructive power of 20,000 tons of conventional explosive; we may be justified in assuming that since then science has succeeded in multiplying this figure several times for later productions, such as the hydrogen bomb. In his speech to U.N.O. on 9th December, 1953, President Eisenhower estimated the modern atomic bomb as 25 times more powerful than the prototype, and the force of the hydrogen bomb as equivalent to millions of tons of T.N.T.: thus we may state confidently that their effect would be devastating upon any man-made construction and on areas of congested population, by reason of their blast, fire, and radio-active products; by contrast, however, troops protectively clothed and masked and dug-in in underground defensive positions, or ships scattered over a wide area of ocean, should be less vulnerable to these effects.

It may therefore be deduced that the productive and communication systems and civilian organisation of an industrial nation offer the most suitable targets for such weapons, and such a nation could not withstand a well-aimed and sustained attack by them that penetrated its defences. Since no nation other than a highly industrialised one could face the economic and logistic problems of a full-scale modern war, it follows that the latest developments of science in the field of mass destruction have largely resolved the conflict of theory quoted above, and defined clearly the proper role of the bomber in a future war, attack on targets that are purely strategic, behind and beyond the tactical battle.

Even now, however, the matter is not wholly clarified, for such a broad claim must be based on several assumptions; first, that the bomber commander has a force of sufficient range and size to reach out and destroy the entire target system; secondly, that he can penetrate, by overwhelming, by-passing, or evading, the enemy's defences; thirdly, that he can locate and identify the targets he seeks; finally that he can bomb with sufficient accuracy to make full use of the destructive power of his armoury. It is no good possessing the nuclear bomb if it cannot be applied to the target, just as it is no use having a bomber that can penetrate the defences if it cannot find the target. The four quoted requirements are interlocking and interdependent, and without one of them the effort expended on the remainder may be largely wasted. In parallel, the vulnerability of the target itself depends upon whether it can be reached, defended actively or passively, located, and identified.

These are generalities and must now be applied particularly, to actual targets and forces as far as security permits. The two main protagonists in any war in the forseeable future can be unequivocably identified. On the one hand is Soviet Russia, with her attendant communist satellites; on the other, apart from countries of smaller military importance, U.S.A., Great Britain, and the Commonwealth, and the democracies who comprise N.A.T.O. What is their standing as participants and targets in a future bombing war?

From the latter aspect the advantage lies clearly with the Communists. As potential targets for strategic bombing the democracies may be divided into two spheres, Europe (including Great Britain) and America. The first group is unfortunately and undesirably well qualified as a target for weapons of mass destruction. First, it lies close to the enemy's forward bases and range consequently offers few problems; secondly, the lack of adequate warning resulting from this complicates and hampers defence; next absence of intelligence security makes targets easy to locate or identify; and finally overcrowding, due to shortage of dispersal space and improvident planning, means that even moderately accurate bombing must do heavy damage. All these factors apply to Great Britain, and furthermore she has yet one more most vulnerable aspect, her ports, which cannot be concealed or moved, are difficult to defend and easy to damage, and upon which her whole existence depends. America, that is the United States and Canada, with her greater space and greater wealth is potentially less vulnerable, since she can afford to disperse and duplicate her industrial and productive resources; unfortunately she too is guilty of grave lack of security and strategic pre-planning, exemplified by placing new production targets within or close to large built-up areas. Thus, as a whole, the democracies in many respects offer a target system that might almost have been specifically designed for nuclear bombing attack.

Though certain of the communist satellites suffer from some of the quoted defects of Western Europe, Russia herself, by far the most important component in the communist system, is far better placed as regards atomic attack. She has the priceless asset of almost unlimited territorial space, so often in the past the undoing of her would-be conquerors, which creates for any potential attacker serious problems of range and of target location, in view of the vast scope for dispersal. Furthermore, such is her curtain of security, drawn not only in the modern era but dating back to a history of defensive secrecy, that very little can be known of the whereabouts of many targets, particularly those recently constructed or evacuated eastwards at the time of the German invasion. True, attacks could be aimed at known centres of population in European Russia, but history and logic alike indicate that killing men is the worst way of fighting a power one of whose chief assets is teeming manpower. Add to these other problems the almost complete lack of survey records or accurate maps for much of the Asian hinterland, and it will be appreciated that the seeker for bombing targets in Russia may well envy the lot of a needle-hunter in a haystack. The one consequent defect in Russia's position is that vast territory and wide dispersal must produce parallel dispersal of defences, which will thus be less effective to prevent bomber penetration.

We have compared the defensive position of the protagonists in a future bombing war, but security (and perhaps ignorance) forbids a similar comparison of offensive forces. All that we may say is that both sides are amassing bomber forces clearly capable of and designed for strategic attacks. Thus we are in the position of a man armed with a rifle in open country, fighting another similarly armed and under effective cover. The prospect appears depressing. We face a war, which optimists describe as possible and pessimists as probable, in which the nuclear bomb may well be the decisive factor, and in which we are intrinsically more vulnerable than our opponents. There can only be one answer, superior offensive armament; our rifle must fire quicker, farther, straighter, and with heavier calibre ammunition.

For some years we were able to view the prospect of the next war with confidence, if not with equanimity, because of our technological and quantitative lead in nuclear science and bomb production. We now know that Russia has also mastered most of its secrets, and, although we may be able to maintain our lead, its practical value will largely disappear as the enemy's nuclear stock-pile grows in size and lethality. With this growth comes also a more urgent need for us to be able to hit our enemy hard before he hits back. It will no longer suffice to grind him down in a war of attrition; we must smash him effectively before he can break our defences and do the same to us. Our requirement therefore is for a striking force which is in being at the outbreak of war, not just a dream in a planner's eye: it must be equipped with aircraft able to penetrate, by speed, armament or evasion, the enemy's defences and reach his targets; it must be able to locate and identify those targets; and it must be able to drop or direct bombs or missiles against them with great accuracy. Requisite bomb loads vary inversely with accuracy to a remarkable extent; if we would reduce bombing error, say from two hundred yards to fifty, we could neutralise with seven bombers a target that previously called for a hundred.

It will be noted that reference is made only to conventional bombers, piloted aircraft which must be able not only to reach their targets but also to return to their bases. The advent of the effective expendable guided missile will resolve many of the difficulties of bomber operation, but, as far as is known, both sides are still some way from perfecting one.

The requirements listed above are ideal and may not be realisable in practice. However, the further we can reach toward them, the better chance we shall have of winning another war quickly and cheaply; and, unless we can do so, it may well not be worth winning at all. There are, however, two provisos that must still be made to such a concept, to meet any further objections of the support school.

It may still be argued with some justification that such an outright victory by bombing would be worthless, if it found us, as victors, with our own cities either annihilated or in enemy hands; or, in other words, strategic bombing would be of little avail, if we could not defend our own targets against similar attacks or against land and sea assault by the enemy's conventional forces. There is no denying this, and it must be agreed that the concept of victory by strategic bombing rests on two assumptions; first, that our air defences are adequate to repel the enemy's bombing for the period required for ours to take effect; secondly, that our army, navy, and tactical air force can also hold, or at least slow, the advance of the enemy's comparable forces, until his infrastructure collapses behind him. If these assumptions prove unjustified, we must modify our bombing strategy; if our air defences fail, we must switch our bombers to offensive defence and neutralise the enemy bomber threat, by attacking his airfields and the communications, supplies, and production of his air force, before returning them to their proper task; secondly, if we are so outweighted that we cannot maintain the battle by land or sea, our bombers must be diverted to attacks in direct support of the integrity of the base. Any such diversions, however, would only be acceptable on the condition that their size and duration were limited to the strictest minimum requirement of the particular emergency, and that authorisation for them should be obtainable only at the highest possible level consonant with promptness, and not at the discretion of individual commanders.

Having conceded these points, we may be permitted to emphasise once more that in misuse lies the greatest threat to the efficacy of our strongest potential weapon, the strategic bomber force. It should not only be effective in war, by bringing victory at less cost in time, blood and effort than in the last two wars. It also has a secondary role, yet one of primary importance, as a deterrent to aggression. We must develop the striking power of our bomber force, not only so that we may strike if necessary, but also so as to minimise the chance of that necessity ever arising. We must not only have the power to crush our enemies quickly; we must be able to show them that we have that power now; if we can do so, they will think twice about putting their enmity into practice.

C. N. Foxley-Norris

CHAPTER VI

SOVIET POLICY AND WAR

BY JULES MENKEN

IT IS probable that for about two years the Kremlin will not consider launching a major war. This time-span might well extend to the summer of 1956, and perhaps through the following winter; in which event—since the Russian spring thaw hinders movement seriously—a period of major tension and grave threat of war need not be expected before the summer of 1957 at earliest.

Two facts and two probabilities sustain this reading of the situation. The facts are unchallengeable. The first, to which the much exaggerated consumer-goods programme testifies, is that consumer shortages have become a serious source of Soviet discontent, and must be lessened. The second, which is evidenced by the new agricultural policy and the proposal to plough under 32 million acres of virgin or fallow land, is that the Soviet industrial and military pyramid now rests on a foundation of foodstuffs inadequate for peace, and wholly inadequate for war. Neither the consumer goods programme nor the agricultural policy, however, can attain the success needed in less than a couple of years as a minimum.

The first probability is that the Soviet Air Force does not yet possess a fleet of fast long-range jet bombers capable of carrying atomic and hydrogen bombs, and trained adequately for mass attacks on American targets. One bomber of this type (it would appear to be comparable to the American B-52) was shown in the Moscow fly-past on May Day 1954; but reliable evidence establishing the existence of substantial numbers was not then available. Such bombers are essential to any Soviet plan for major war. Two or three years would seem to be the minimum time in which the necessary numbers could be produced and the crews trained. If in fact they do not exist, it follows that for some such period the Kremlin is unlikely to embark deliberately on major war.

The second probability concerns the internal position of the new regime. The arrest and execution of Beria and his most prominent subordinates testify to a struggle for power among Stalin's successors. But the speed with which this struggle came to a head, the ease with which the Malenkov-Molotov-Khrushchev team apparently overcame what should have been the entrenched and formidable opposition of the former head of the M.V.D., and the fact that, despite a number of changes in leading personnel of the second and third rank, no major purge or other evidence of acute, crystallised, or sustained conflict has come to light, all suggest that the new men in the Kremlin have not had their authority or power seriously challenged. If correct, this implies that the transition from the nearly thirty years of Stalin's dictatorship to the very different dictatorship of his successors has been made successfully. The structure of the Soviet state continues to rest on the three main pillars of Party, Army, and administration—the heads of industry, the leading bureaucrats, the heads of the trade unions, the organisers and controllers of scientific and intellectual work. The secret police and its armed formations, always a potentially threatening *imperium in imperio* which Stalin kept under control by methods not fully discernible in their detail, though of course not abolished—no dictatorship whose power rests largely on fear can do without this ultimate internal sanction—appears to have been sufficiently reorganised to eliminate any serious danger to the rest of the regime. The Army seems to have gained somewhat in authority and influence. But nothing which has happened would appear to have weakened in essentials the Party—the most important organ of rule; and the power of its topmost group, apart from changes in its personnel which are secondary except for Beria's elimination, therefore continues, and indeed in important respects is greater than before. It is true that Stalin's successors lack two things which the great tyrant enjoyed throughout his latter days of rule. First, the changes which they have made in personnel—and which must have been followed by other less known changes at lower levels, as ripples spread outward when a stone is cast into a pond—must mean that the hierarchy of rule is not yet as fully consolidated as in Stalin's final period; nor can full consolidation well be achieved before another couple of years have elapsed. Secondly, Stalin's successors have not inherited the aura of personal legend or myth—one of the most potent of all instruments of rule—which, in dictatorships as in monarchies, is an essential ingredient of the "divinity" which "doth hedge a king," and which they must seek—and are manifestly seeking—to create for themselves before they can be ready for any supreme strain such as major war would bring. Even to make a beginning with this most difficult task, two years is a very short time.

Analysis is not crystal-gazing, and this analysis may well be wrong. A span of two years or of three years is quite long enough for a policy aimed deliberately at war to mature. The notorious secret conference in which Hitler first informed some of his highest officials that "the German question can be solved only by force," * and from which his active forward policy dated, was held on November 5, 1937, less than a year and ten months before he invaded Poland; while by September 1, 1936—three years before the invasion of Poland—the crisis caused by the re-occupation of the Rhineland the preceding March had been substantially overcome, and to most people and most governments major war seemed very far away indeed. Even with a policy not deliberately aimed at war there is always the danger—one of the smaller dangers in the peril-strained world of the mid-1950's—"that someone, somewhere, will so conduct the affairs of his country that, unintentionally and almost imperceptibly, it drifts into a position from which there can be no withdrawal without national humiliation;" † and two or three years are quite long enough to bring this danger to a head. Nevertheless, though major war may come earlier than mid-1956 or mid-1957, the probabilities at the time of writing (March–May, 1954) do not suggest this. A forecast resting on facts and analysis cannot go farther.

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* This was the conference the minutes of which are known as the Hossbach minutes, after Hitler's adjutant at the time, who kept them. The officials present included the Minister of War, Field-Marshal von Blomberg, the Commanders-in-Chief of the German Army, Navy, and Air Force, respectively General von Fritsch, Admiral Raeder, and (as he then was) General Hermann Göring, and the Minister for Foreign Affairs, Baron von Neurath.

† Lord Salisbury, March 24, 1954. Lords' Hansard, Vol. 186, col. 653.

Whether the masters of world Communism will in fact resort to major war in the more distant future is a different and much more obscure question. In seeking an answer the essential difficulty does not lie in the greater remoteness of time, but in appraisal of the numberless factors of all kinds whose final resultant will be peace or war. Three major factors are manifest at once. The first concerns desire and purpose; will the men of the Kremlin continue to desire and seek the Soviet-centred, Great Russian-centred, and Kremlin-centred world domination which they miscall "world revolution"? The second major factor concerns methods: can Communist world domination be achieved without a major war? The third factor concerns means: can the Communists wage successfully a major war aimed at world domination?

1. Will the leading Communists continue to seek world domination? One school of contemporary observers answers this question with a qualified negative. The makers of the Bolshevik revolution, they argue, were fired by an *élan* and a vision. The *élan* sprang from the belief and conviction that Communism would create a new and better world with higher human values, and from the desire for power in order to bring that better world to birth; the vision, derived largely from the Marxist analysis of society, saw how this utopia was to be torn out of the very womb of history—how the "toiling masses" of industrial workers, millions of peasants hungry for land, and other millions under foreign control in "colonial" or "semi-colonial" countries would combine under the leadership of the "proletariat" (that is, the inner circle of indoctrinated and tested Communist revolutionaries) and, by their own efforts or with a measure of aid from "the land of socialism," would overthrow their "bourgeois," "capitalist," and "imperialist" "exploiters" and "masters." Both *élan* and vision were essentially revolutionary, this argument continues; as such, they are subject to the laws governing all revolutions. But experience shows that the wave of passion, creativity, and hope which revolutions release in their early days gradually loses momentum with time; as the years pass, the kingdom of heaven which revolutionary fervour sets out to storm and bring down to earth is seen to be as remote as before, while the effort and perils required to win it are felt to be decreasingly worth while. As these lessons are brought home, the heirs of the revolution turn their eyes and their hearts to what their predecessors won and they enjoy, and set themselves to consolidating and holding it. The Soviet world, according to this argument, is now a world in which the second revolutionary generation is already ageing, and a third generation is coming forward. There is no reason to believe that the Communist revolution accomplished on Soviet soil departs from the essential psychological or political pattern of other revolutions. The lessons of history therefore teach that the desires and purposes of wider conquest which the masters of Soviet society cherished at an earlier stage will sooner or later die away or be dissolved in the flesh-pots of power actually possessed and enjoyed. In sum (and with a different metaphor), the angry seas of Communist revolution and world conquest, which threatened earlier to burst the dykes barring them from the fair lands of the free world, though still surging and storm-tossed, are losing concentrated direction and power; and the free world need only maintain its dykes and keep them strong—itself an arduous and costly task—and with time the waves will subside and the peril pass.

This argument may be correct, as is devoutly to be hoped. If so, the entire course of world policy will gradually change, and will swing in the direction of assured peace. But before such a change can be prudently expected, the argument itself must be closely examined.

One point may be cleared away at once. It concerns the placing of the Bolshevik revolution and the Communist drive for world domination in the pattern of revolutionary structure and the time-scale of revolutionary development generally. About this pattern and time-scale too little is known for confident generalisation; but it seems clear that the French Revolution supplies the precedent to which the argument just outlined primarily refers. It is true that the *élan* and vision with which the French Revolution began did gradually spend themselves, that internal excesses and terror gave way to a stable (and despotic) regime, that the exhaustion caused by prolonged wars and insecure conquests brought ultimately a desire for a stable peace. But where, on this analogy—which like all historical analogies can afford only the roughest of guides to present problems—does world Communism stand today in the revolutionary pattern and time-scale? France retained enough *élan* under Napoleon to fight for another fifteen years after the earlier, purely revolutionary, wars had ended. Is the Napoleonic period of the Communist revolutionary effort still to come—or does this question strain the assumed parallel beyond the point of profitable comparison? And in any event, does the French Revolution supply the pattern really relevant to the Communist enterprise? Other revolutions have followed a different course. The Reformation and Counter-Reformation—which may be regarded as parts of a single whole—saw an early period of wars followed after an interval by the struggle which convulsed and devastated Central Europe during the Thirty Years War. The Industrial Revolution—which has a partial relevance because it also released new energies, roused new hopes, and opened the gates of social change to new groups and classes—has continued, though with varying rhythms, for almost two centuries. The Meiji Revolution, which transformed Japan's political, economic, and social structure, and released new energies and ambitions in doing so, may be regarded as continuing its essential momentum through Pearl Harbour until a full stop came with defeat in 1945. The Nazi Revolution, though much shorter-lived and more profoundly influenced than most revolutions by the character and personality of a single man, followed a similar course. The Chinese Revolution of 1911, both in its own course and as in part clearing the way for the subsequent effort of the Chinese Communists, presents yet another variant. A proper analysis of these and other revolutions would be a task far beyond the scope of this chapter; but the examples cited must surely suggest that, even if a general revolutionary pattern can be discerned in the enormously complicated flux of events, knowledge both of other revolutions and of the present stage of Soviet development is quite inadequate to fit the Communist enterprise into place in the time-pattern of the past, or to hold with any confidence that, because the original Communist *élan* and vision may be waning (if in fact they are), a changed course of Soviet policy and a period of less danger for the rest of the world lie ahead.

A more far-reaching objection to the argument about (possibly) decreasing *élan* rests on the essential nature of the Communist enterprise itself. A messianic vision of a transformed world, and the *élan* which seeks to achieve it, are neither the deepest nor the most dynamic urges in Communism. At bottom and in action Communism is a doctrine and practice of power, which partially disguises itself as a gospel of individual fulfilment, national liberation, and social betterment. For the initiates and inner circle at the top, both doctrine and practice are avowed and unashamed; the gospel of promised fulfilment, liberation, and betterment concentrates mass frustrations, resentments, discontents, and desires in a form which the power-seekers and power-wielders can use for their own purposes. The power sought is the power to dominate—one of the oldest and strongest of human temptations; since domination is the aim, fear lest those who would dominate may themselves be dominated is inextricably intermingled with the will to power and to domination itself. This amalgam of will-to-power and fear can neither be satisfied nor cured; even the exhaustion brought on by failure can do no more than transform it into a sullen but still furious resentment. External difficulties may block action, but no inner restraints except fear of failure can check those whom this amalgam masters—least of all when they are Marxists who, in order that their desires and action may be wholly unrestrained, have deliberately developed a world-outlook which repudiates all moral and transcendental values. Men thus hag-ridden have no understanding of the principle, "live and let live"; they know, and can know, no inner security while others who may become rivals or possible foes enjoy freedom or even existence; they have, and can have, no other ultimate purpose than the destruction of those others.*

Even if this picture of the essential nature of Communism be accepted (and many who are not Communists would reject it angrily), it may still be argued that these characteristics give no clear guidance as to what Soviet policy will be in the years ahead. The masters of Soviet society, it may be urged, have immense power; and power on such a scale not only sobers its possessors and moderates their action, but must also tame their desire and curb their ambition for world conquest.

This may be so. That prudence—and especially fear of atomic and hydrogen weapons—will restrain Soviet *action* is of course true; whether *desire* and ultimate *purpose* will change is another question. There are important considerations which suggest the contrary. First, although those at the top of the Soviet pyramid enjoy great material advantages, prestige, and power, these attach to their position and functions, and neither are hereditary nor make their possessors secure. But it is security which rashness or overstrain may jeopardise that leads men to eschew adventures, just as it is in the second and succeeding generations of *descendants* that the desire for enjoyment often overbears the desire for rule, power, and conquest. But the Soviet system lacks both safeguards; by linking privilege to function and to office, it is calculated to sustain the ambitions—as it certainly continues the insecurity—of the Soviet *élite*; far from tempering ambitions, it therefore exacerbates them, the more so since its standards and code help the unscrupulous and ruthless to the top and set no bounds to their aims when they get there. Secondly, the structural factor itself conduces to a policy of Soviet expansion. The larger the area of rule, the greater and more varied are the opportunities open to the ruling *élite* and to those pressing up into it—and the greater also is the scope, prestige, and power of those at the summit. Conversely, any abandonment of ambitions of further conquest would reduce the numbers and opportunities of many *élite* groups, perhaps especially in the armed forces. The tensions thus created would favour on balance the active, thrusting elements among those threatened or adversely affected by restriction, not least by weakening the position of men who, though they themselves might prefer a quiet life and enjoyment of their gains, must fear the injury which the pressure of others might do them. Thirdly, a specifically Great Russian factor must also strengthen the Communist desire for continued conquest and ultimate world domination. This factor deserves extensive discussion; all that is possible here is to point to the fact that the history of the Great Russian state from the earliest emergence of Muscovy to the present day is a history of continuing expansion and ever-growing ambitions which only failure and exhaustion in war or internal weakness and prolonged domestic disorders have ever checked.

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* Raymond L. Garthoff puts this point admirably: "From the Bolshevik viewpoint, if the initiative [on seizing and maintaining which both Bolshevik military doctrine and Bolshevik political doctrine insist] is not firmly held and used to destroy the enemy, then the enemy will seize the initiative and destroy them. Thus, reflecting in their own actions their perverted image of 'the enemy,' who, they believe, is always actively seeking to destroy them, the Bolsheviks feel compelled to use the initiative to destroy him first. The central question in Bolshevik thinking is not 'Will there be a conflict?' but 'What form of conflict is most advantageous for us to use to destroy the enemy?' Who will prevail over whom? (*Kto kogo?*). . . . This is manifestly aggressive, but it is also in part a defensive reaction to the fear that, unless the enemy is 'controlled' by being forced to take counter-measures against Bolshevik action, he will 'control' the Bolsheviks by using his initiative to dictate their behaviour. . . . So long as the idea of *Kto kogo?* (that either the enemy or the Soviet (Party) leadership *must* destroy the other) remains, there can be no lasting peace for the Soviet leaders until the enemy is totally annihilated. Annihilation is considered to be the *necessary* and *sole* alternative to being annihilated, and all who are not absolutely controlled are potential opposition." (*How Russia Makes War* (London: Allen & Unwin, 1954), pp. 88, 150.) Originally published in the United States under the title *Soviet Military Doctrine* (Free Press, Glencoe, Illinois, 1953), this book is by far the most thorough, systematic, and penetrating study of its subject in existence, and of great importance also for understanding Soviet policy generally.

The ethos of men whose entire being is concentrated on power is utterly different from the ethos of the free world. It is true that it was not a Soviet but a German idolator of power who wrote in what he called his "Political Testament":

> Never allow two Continental Powers to arise in Europe. Regard every attempt to organise on Germany's frontiers a second military power—or even an attempt to form a state which might become a military power—as an attack on Germany. See in such a situation not merely the right but the duty by any and every means, including armed force, to prevent the rise or crush the existence of any state of this character.*

But Hitler's essential thought, with the change only of a few words, might well come from any member of the topmost Soviet hierarchy. And it was in fact a member of that hierarchy who said expressly in 1940 that the Soviet Union could not tolerate the *moral* threat represented by even the strategically crippled Finland whose defensive strength Soviet arms had already broken.†

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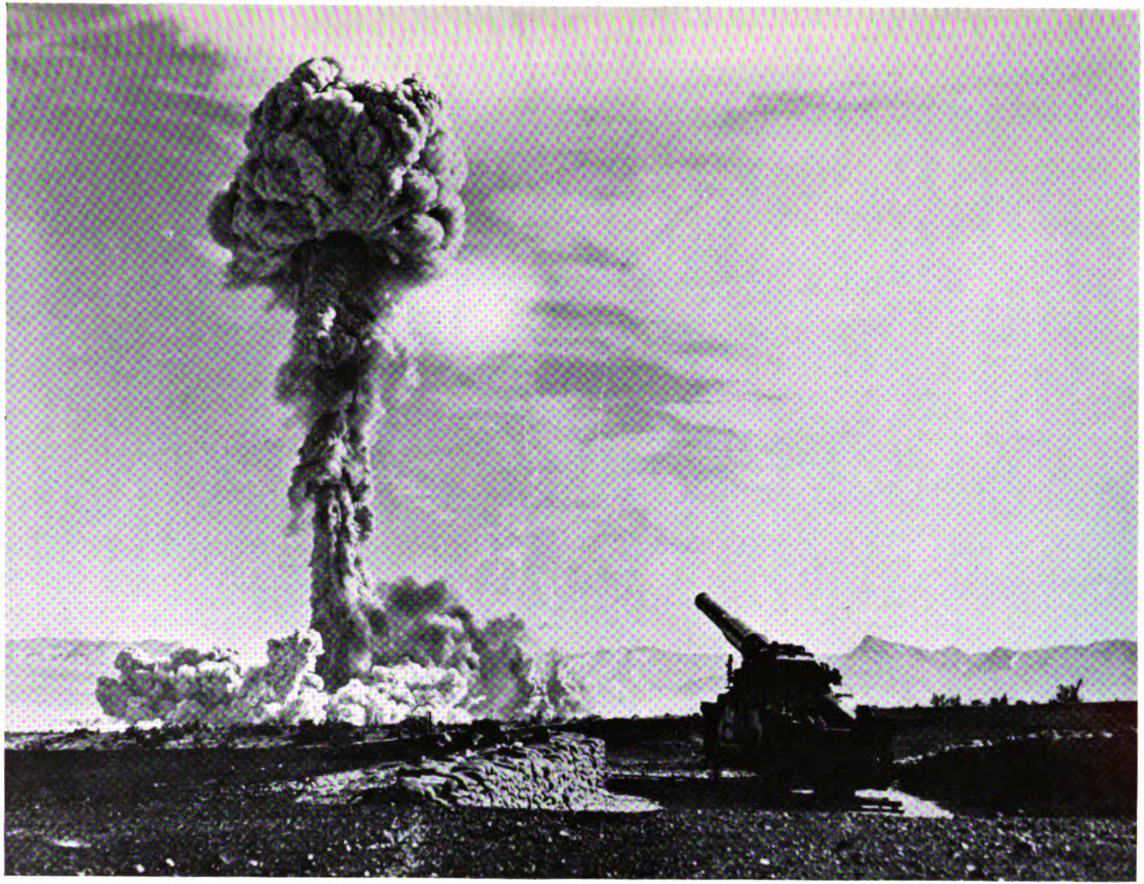
* Adolf Hitler, *Mein Kampf* (Munich, 342nd–346th edition (two volumes in one), 1938), p. 754.

† *The Memoirs of Marshal Mannerheim*, translated by Count Eric Lewenhaupt (London, Cassell, 1953), p. 452. It was Hitler himself who told Mannerheim this at their meeting (at which President Risto Ryti of Finland was also present) on June 4, 1942; but there seems no good reason for holding that Hitler distorted this part of his discussion with Molotov in Berlin in November, 1940, when the Soviet Foreign Minister, according to Hitler, made this quite characteristic observation.



(*Office of Public Information, U.S. Department of Defence*)

The First Atomic Shell. The mushroom cloud formation from the first atomic shell fired from the United States Army's new 280 mm. gun, in Nevada in May 1953

Time, which changes many things, may in the long run also weaken or alter the direction of Soviet and Great Russian desires. Some twenty years hence Soviet policy may no longer aim at world domination. If so, the proof will be easy and plain to see; Soviet disarmament will be swift, and massive in scale; the immense Soviet armaments industry will be largely dismantled; and the world will be allowed to check for itself these great strides towards real peace. But until this proof is forthcoming the West must assume that the masters of the Kremlin continue to desire world conquest, and will seek it at every opportunity and by every practicable means. In an age of atomic and hydrogen weapons any other assumption would be suicidal.

2. Can Communist world domination be achieved without major war? On one reading of Marxism, the answer is, "Certainly; the inevitable processes of history (as Communists see them) will bring this about." Lenin's last article, in which he expresses his belief in the "inevitability" of the ultimate "complete victory of Socialism," is a classical formulation of this view. In discussing the struggle to achieve Socialism, while doubtful whether the then weak Soviet state could save itself from a fresh conflict with "imperialist" countries which at the time he regarded as "impending," Lenin wrote that

> the upshot of the struggle as a whole can be foreseen only because we know that in the long run capitalism itself is educating and training the vast majority of the population of the globe for the struggle.
>
> In the last analysis, the upshot of the struggle will be determined by the fact that Russia, India, China, etc., account for the overwhelming majority of the population of the globe. And it is precisely this majority that, during the past few years, has been drawn into the struggle for emancipation with extraordinary rapidity, so that in this respect there cannot be the slightest shadow of doubt what the final outcome of the world struggle will be. In this sense, the complete victory of Socialism is fully and absolutely assured.*

This forecast is patently over-optimistic. The Communist struggle for world domination (in Lenin's phrase, "the complete victory of Socialism," where "Socialism" means what is now called "Communism") involves far deeper and less tractable problems than earlier Communist leaders foresaw. Stalin's growing appreciation of these problems, particularly after the Second World War, is reflected among other things in the tremendous armament effort which his policy imposed on the Soviet Union.† The same problems are no more tractable today. The critical issues which focus them are three: What does Communist world domination really mean? Within what time-span is it to be achieved? By what means is it to be achieved?—whether "inevitably," as Marxists bemused by the fanaticism of their theories and desires believe, or by the positive policy and directed action which all great conquerors of the past have recognised as essential to attain their ends.

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* "Better Fewer, But Better," written on March 2, 1923, and published in *Pravda* two days later; V. I. Lenin, *Selected Works in Two Volumes* (London, 1947, Lawrence & Wishart), vol. II, p. 854.

† In his election address on March 10, 1954, Marshal N. A. Bulganin acknowledged that Soviet armaments have been increased ever since the end of the Second World War: "Since the victory won in the Great Patriotic War, the Party and the Government have not relaxed their efforts to strengthen our defence capacities. As a result of the work which has been carried out, the Soviet Army and Navy, having absorbed the combat experiences of the Great Patriotic War and having mastered in practice the latest military equipment—with which they have been supplied in adequate quantities—have in the past few years made huge strides in their organisational and their operational and tactical training, and in their increased combat strength. . . . At the present time our Air Force is equipped with completely up-to-date high-speed jet planes. All the necessary measures have likewise been taken in this connection as regards the ground forces. . . . The technical equipment of our armed forces increases year by year." (*Soviet News*, No. 2916 (London, March 19, 1954), p. 6.)

Communist world domination will obviously not be achieved at a single stroke. Not even the Communists themselves believe this. If achieved at all, it must therefore be achieved by stages (perhaps with some setbacks), each of which must enlarge the area and population under Communist rule. This means that at each successful stage one of three things must happen, viz. (1) Communists must achieve power by internal, mainly non-violent, means; or (2) they must fight their way to power in an internal struggle; or (3) they must defeat and overthrow a non-Communist regime in war, and replace it by a Communist one. In the first two cases Communist forces—Soviet or Chinese—beyond the frontiers *may* intervene openly or covertly; in the third case they *must* intervene. Examples of the first case are Poland, Rumania, and Bulgaria after 1945, and the Czechoslovak *coup* of 1948. Examples of the second case are Russia herself during the Russian Civil War, and China. There have so far been no examples of the third case. (Finland in 1939–40 might have fallen into this category—and was perhaps originally intended to—but in the end did not; Korea in 1950–53 would have done so but for United Nations' resistance.)

Now if the time-factor be neglected—if, say, some such period as a century is envisaged—Communism will be achieved without major war only if (*a*) Communists manage to keep their present and future gains, and (which is the practical point) bring them effectively under Soviet control; (*b*) if the masters of Communist world policy do not fall out among themselves; and (*c*) if the non-Communist world takes no effective action to stop or reverse the (on this assumption) piecemeal but relatively steady advance of world Communism. On a long view, however, it is obvious that none of these conditions can be assumed. Condition (*a*) would be invalidated by geography. Where countries are contiguous to the Iron Curtain, Communist control might indeed be extended over them as they fell (on this assumption) *seriatim* to the Communists. But should a Communist government be voted into, say, Brazil, it is inconceivable that, even if the United States did not intervene, the Kremlin could exercise really effective control; distance alone would make this impossible, to say nothing of other influences which would work against it.* As regards condition (*b*), the evidence of history testifies conclusively against the ability of any group of men over any really long period to maintain unity about the ends and means of policy, or about the distribution of the spoils of conquest and empire, or about the division of power and rule. Any past century in any part of the world provides ample evidence that this is not the way that men, with all the violence of their passions, or the processes of history, ever work.

Even more important, it is wholly inconceivable that condition (*c*) would be satisfied—i.e. that the non-Communist world would in fact take no effective action to stop or reverse the Communist advance. For example, if Brazil were to vote itself Communist, the United States (presumably invoking the Monroe Doctrine) would certainly intervene to reverse this decision; and similar action would be taken *a fortiori* in the case of members of N.A.T.O., among whom, indeed, it is also inconceivable that, say, Britain would see, say, France or the Low Countries go Communist without taking positive and vigorous measures to redress the situation. The fundamental reasons for action of this character should be clearly understood. The democracy which the West embodies and by which it lives is a way of life. But in this phrase the important word is not *way;* it is *life.* This means that, so long as others do not threaten its life, the *way* which the West regards as most excellent, and which its traditions ~~and~~ institutions embody, will be maintained; but if the *life* of the West itself is imperilled—as the continued onward march of Soviet and Chinese Communism would imperil it—then the ways and methods suitable for other circumstances and conditions will be temporarily abandoned while those menaced with destruction defend their life itself. In other words, the belief that Communism can advance to world domination without major war by processes which are historically "inevitable" assumes that the political rules of nineteenth and twentieth century democracy, under which Communism first developed and thanks partly to which it has expanded and flourished, will always be observed to its advantage; and that its intended victims will always lack the discernment, the will, and the energy to defend themselves. But this, once again, is contradicted by the very facts of history to which (when selected for their purpose) Communists like to appeal. It is contradicted also by the facts of the contemporary world which any keen observer need only interrogate closely in order to read aright.

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* The rising which broke out on June 18, 1954, and after a brief and almost bloodless struggle overthrew the pro-Communist Arbenz government in Guatemala, illustrates the difficulties which the Kremlin (or Peking) must encounter in attempting to establish Communist regimes under their effective control in areas to remote for Soviet (or Chinese) armed forces to intervene.

The question whether Communism can achieve world domination without major war is thus not a question of what *may* happen "inevitably" over a century; it is a question of what Communists *can* accomplish within the next twenty years or, perhaps, the next ten. And this in turn brings us to what Communist world domination really means.

To this question the answer is wholly unambiguous. Communist world domination must mean ultimately the establishment of a Communist regime in the United States—and, from the Soviet point of view, the establishment there not only of a Communist regime, but also of one which is dominated by the Kremlin. On this point there must be no mistake. Hitler's view about Germany and her neighbours applies with redoubled force to world Communism in relation to the United States. Even if Communist doctrine and practice could inculcate an altruism wholly alien to their nature, with the result that Soviet Communists would feel that they had attained their end if American Communists ruled independently in Washington, Soviet Communists who are also Great Russians could never be content to have as their most powerful world neighbour a Communist United States which did not acknowledge and accept Moscow's primacy. From the Soviet point of view, it cannot be enough merely to establish a Communist United States. Communist world domination as the (mainly) Great Russians who rule from the Kremlin do and must envisage it cannot be fully achieved unless and until the springs of American will and American independence have been broken.

Can this be done without major war? An observation of Stalin's supplies a clue to an answer. In a fundamental discussion of Soviet strategy Stalin wrote:

> The plan of strategy is the plan for the organisation of the decisive blow in that direction in which the blow can most quickly give the maximum results. . . .
>
> In other words, to define the direction of the main blow means to predetermine the nature of operations in the whole period of war, to determine nine-tenths of the fate of the entire war. In this is the task of strategy.*

If in this passage the word "struggle" is substituted for the word "war," the criterion which Soviet world policy must use is plainly indicated. The Soviet main blow must be directed against the United States as the main enemy. Communist world policy, that is, *must* weaken the United States, divide it from its allies, and prepare for later and decisive action.

What, then, can weaken the United States and divide it from its allies? In this stage of the world struggle the Communist answer lies partly in strategic geography and partly in the political field—the two, of course, being linked at important points. In strategic geography, the United States and the West as a whole will be weakened by wresting from them areas of major importance in terms of population, industrial resources, vital materials, and strategic significance. On a world scale the principal areas, moving clockwise from Moscow as a centre and not in order of importance, are: Japan; Korea, both defensively and as a springboard to Japan; Formosa and Okinawa; Indo-China; the rest of South-east Asia; India and Pakistan; the Middle East with its oil, its land-bridge to North and Central Africa, and its approaches to the Mediterranean; the Mediterranean; Germany and the German-Belgian-Northern French heavy-industrial complex; France; the Low Countries; Britain; Scandinavia as one spring-board to Britain and as a base-area for submarines; certain Arctic regions. Some areas in this list are obviously more important than others; the key ones (though this choice is open to debate) are perhaps five; Japan, Indo-China, the Middle East, Germany, and France.

Three of these very crucial areas lie in Asia, and two in Europe. Of the Asian areas, one (Indo-China) is in a mainly Chinese Communist field of operations (except for *matériel*, where Soviet and European satellite resources must be drawn in); one (Japan) is in what is perhaps for the time being a joint Soviet-Chinese field; and one (the Middle East) is in a wholly Soviet field. The two European regions also lie in a Soviet field of action.

The practice, when blocked in Europe, of turning to Asia, and when blocked in Asia, of turning back to Europe, was a classical feature of Tsarist policy; and the existing situation thus presents Moscow with problems which in certain major respects are familiar, though complicated today by the active participation of China (which under the Tsars was always an object of predatory Russian policy, but for Communist world-purposes must play, at least for the time being, the rôle of junior partner), and by the problem of sustaining and developing native Communist movements as subsidiary local agents of Communist world strategy. Here, therefore, is no significant change; nor need one be expected in the reasonably near future. Asia will obviously focus strong Communist efforts to expand and will continue as an area of Communist "small wars" of one kind or another.

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* J. V. Stalin, "On the Strategy and Tactics of the Russian Communists," 1923; reprinted in *Sochineniya*, vol. 5 (Moscow, 1947), pp. 163–4. The translation given above is taken from Garthoff, *How Russia Makes War*, pp. 14, 130.

In Europe, where Germany and France are crucial goals, Soviet policy will rely in the first instance on political means. The Soviet aims may be expressed as a series: first, if possible, to bring the whole of Germany under Soviet control, thus putting German industrial resources and German manpower at the disposal of the Soviet war machine; if that fails, to deprive the North Atlantic Alliance of West German resources and manpower; if that fails, to paralyse France and make the logistically vital French base unusable by N.A.T.O.; and generally to split France—and if possible Britain also—from the United States by differences over Germany and European defence, over Indo-China, over the recognition of China and its admission to the United Nations, and over the use of atomic and hydrogen weapons. In all this endeavour France, as the weakest link in the N.A.T.O. chain, will be the target of special Communist effort.*

Neither in Europe nor in Asia can the Communists carry out their designs without provoking or launching all-out major war. A serious Communist attack on Japan, for instance, would produce a corresponding American reply; a Communist advance in the Middle East would encounter Turkish, British, and American resistance; a Communist attempt to incorporate all Germany into the Soviet area or to overrun Western Europe would infringe the North Atlantic alliance and would bring Britain, the United States, and other powers into action. But even if none of these things were so, even if the Communists could go ahead successfully in all the major strategic areas of Asia and Europe without causing an all-out war, the supreme problem of Communist strategy —how to Communise the United States and bring it under Kremlin control—would still remain unsolved.

Can this problem be solved without all-out major war? Conditions for which there are historical precedents can be imagined in which this might be possible. For example, if the United States were rent by civil strife, one party seeking its own triumph might invoke the assistance of Soviet armed forces and prepare them an uncontested entry. Such things happened in the Greece of the Peloponnesian War, as Thucydides describes; in France during the Wars of Religion in the sixteenth century, when the French Protestants obtained help from England and Germany, while the French Catholics solicited the support of Spain; and in the Spain of our own day, when foreign forces were drawn into the Spanish Civil War and fought on both sides. Or to consider quite another possibility, if a wave of extreme pacifism and isolationism swept over the United States, whereas the Soviet Union remained militant and armed to the teeth, it is conceivable that Soviet forces might overrun North America without hostilities on the scale of modern major international war. But even to contemplate such eventualities verges on silliness. The practical problem is not what men might do in the extreme cases of weakness and folly which can be conceived or are recorded on one or another page of history; the practical problem is what is probable in the middle decades of the twentieth century. But in this time and situation both problem and answer are clear; so far as can be foreseen, it is wholly beyond possibility that the contemporary United States, with its immense vigour and deep awareness of the Communist menace, with the insight, resoluteness, and strength of will of its new ruling *élite*, and with its magnificent material resources and the fervour and patriotism of its people, should in fact be overborne by world Communism except after a major war in which all that Americans have and hold dear was flung into the struggle. Nor would the United States fight alone in such a supreme struggle. And unless this entire reading of the situation is mistaken, it follows that, in any circumstances in which the issue may be presented practically to this generation, whether or not the Communists can hope ever to achieve world domination—and their final success is most improbable—they cannot achieve it without major war.

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* French history, as the late Lucien Romier shows in a clear and comprehensive short account (*A History of France*. Translated and completed by A. L. Rowse. London, 1953, Macmillan), has for centuries swung with almost cyclical regularity through phases of weakness and disorganisation succeeded by phases of consolidation and strength. Because of excessive concentration on the history of Revolutionary and post-Revolutionary France, the historical duration of this quasi-cyclical movement is not commonly appreciated. The downward phases are broadly of two kinds—those of widespread general impoverishment and weakness, accompanied by bad or weak government; and those when vigour, energy, and relative or substantial prosperity exist in the field of private life, but when regimes enfeebled by various causes are unable to concentrate and direct this private strength for the purposes of the state. Present-day France is in one of the latter phases; many of the reasons are analysed with keen insight in Ronald Matthews' study, The *Death of the Fourth Republic* (London, 1954, Eyre & Spottiswoode); the political background is brilliantly discussed by Philip Williams in Politics in *Post-War France: Parties and the Constitution in the Fourth Republic* (London, 1954, Longmans, Green), by far the most thorough and informed study of its subject so far published in English. This state of things clearly encourages Communist hopes. But France's remarkable recuperative powers and spiritual strength must never be underestimated.

3. Can the Communists wage successfully a major war aimed at world domination? At present and for about the next couple of years the answer would appear to be, "No," for the reasons (among others) given in the early paragraphs of this chapter. As regards the remainder of the period of ten to twenty years in which the problem is a practical one in something like its present form, the answer is less simple.

Three situations may be assumed, not because reality can be thus simplified, but in order to separate the major factors and dangers and bring them as far as possible into focus. In the first situation it is assumed that conventional weapons alone would be used. In the second situation it is assumed that atomic and hydrogen weapons would supplement conventional weapons, but that initial surprise would be absent. In the third situation it is assumed that surprise would be added to the use of all forms of weapons.

This situation broadly parallels the Second World War; and in it distance, and therefore logistical factors, have an outstanding if not necessarily a paramount influence. Just how a major war with conventional weapons would begin is, in this connection, of secondary importance; the vital fact is that both the Communist world and the United States would have to transport great masses of men and weapons over large distances in order to achieve the quantitative superiority required to beat down and defeat the enemy. American techniques of amphibious warfare (including the naval train developed during the Second World War) are greatly superior to corresponding Soviet techniques and resources, so that it might well be possible for United States forces to effect landings at many points on the long Communist periphery, and to bring successfully to battle the Communist forces locally encountered or transported there. But although local peripheral superiority might rest with the United States, as advance into the interior became necessary, the initial American logistic advantages would be reversed; the deeper the American penetration became, the greater would be the American effort required and the smaller the corresponding Soviet effort. In this situation, therefore, it is conceivable that the Americans, if fighting alone or almost alone (i.e. if for the purpose of this immediate analysis it is assumed that the Communists had overrun the whole of the Eurasian continent), would bleed themselves to death before they could defeat the Communist world decisively. Conversely, however, the Communists, if using conventional weapons alone, would lack the resources required to invade and decisively defeat the forces which the United States could marshal on the North American continent. It follows that, although the Americans through over-exertion and exhaustion could lose a war waged solely.with conventional weapons, the Communists could not win such a war by successfully invading the United States. This conclusion assumes that morale and unity and determination would not fail the American people in the immensely perilous situation here envisaged, and also that they would manage somehow to procure (or devise substitutes for) the large quantities of varied raw materials which their defence industries would require.

This is the situation envisaged by the British Defence White Paper, which suggests that "such a war would begin with a period of intense atomic attacks lasting a relatively short time but inflicting great destruction and damage." The White Paper obviously considers that this intensive atomic period might knock one side out; alternatively, "if no decisive result were reached in this opening phase, hostilities would decline in intensity, though perhaps less so at sea than elsewhere, and a period of 'broken-backed' warfare would follow, during which the opposing sides would seek to recover their strength, carrying on the struggle in the meantime as best they might." Without attempting to define the situation more closely, the White Paper concludes that "our active forces must be able to withstand the initial shock. Our reserve forces must be capable of rapid mobilisation behind the shield which our active forces provide and be able to perform their combat tasks at the earliest possible moment." *

The White Paper does not attempt to define the factors which would determine whether the period of intense atomic (and hydrogen) attack would be decisive, or whether it would leave one or both sides in a condition to carry on with "broken-backed" warfare, or what would be the nature and size of the forces available for that "broken-backed" phase, or how hostilities would develop (if at all) thereafter. It is perhaps wiser not to attempt to probe these matters in any detail at the end of a chapter which is already long; but it may be tentatively suggested that at least two

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* *Statement on Defence*, 1954. See p. 373.

relevant factors must be the relative size of the opposing forces capable of delivering atomic/hydrogen weapons on chosen targets and the relative strength of the defences. If this suggestion is correct, it implies (among other things) that if the Soviet Union were to develop striking and defensive forces qualitatively similar but quantitatively much superior to the American and free world's forces, a decisive Communist blow might be possible in this initial atomic phase. Since Soviet military doctrine and practice are known to favour in all fields a build-up of great quantitative superiority, it follows that any undue or ill-advised reduction of the American or free world's atomic or defensive forces in the interests of economy could create a situation in which a Soviet victory could be possible.

So important, not say vital, is this whole subject that, despite the manifest difficulty of isolating, appraising, and recombining the many relevant factors, a major study of it is urgently called for. Here it may be suggested that one clue to Communist, and in particular to Soviet, world policy is the desire and purpose of the Kremlin to build up a force which in its judgment will be able to crush the free world when the moment comes. All else is a mere gaining of time and garnering of other advantages until this moment can be reached.

The important difference between this case and the preceding one lies in the size of the atomic/hydrogen forces required to reach a decision. The Soviet rightly assume that the West will not launch a preventive war. The great risk they run arises, therefore, from the West's reply to an initial Soviet blow. But if by a multi-pronged Pearl Harbour against the (mainly American) atomic/hydrogen bomber bases and the factories which make such aircraft a large proportion of them could be destroyed in the first hours of war, the size of the Soviet atomic/hydrogen forces required to deliver a decisive blow would *ipso facto* be immensely reduced. The Khokhlov case with its revolvers disguised as packets of cigarettes and its cyanide-carrying bullets is fresh evidence of the care and cold-blooded calculation with which the Kremlin will seek to compass its ends. If so much trouble and effort will be taken merely to eliminate a few individuals whom the masters of Soviet policy regard as dangerous, how much more pains will the Kremlin take in a field where largely successful surprise would go farther than any other single measure to accomplish its supreme purpose of world domination? And what could be done which would more surely help the achievement of surprise than to spread abroad a propaganda to the effect that the Kremlin will never deliberately launch a major war, but will seek to achieve its end by small wars and political means alone?

To sum up. During the next ten or twenty years (the period, that is, which is practically important to the present generation) no convincing reasons can now be seen for thinking that the masters of world Communism will abandon their desire and purpose of achieving world domination. The Cold War alone, however, cannot bring them to this goal. Even the maximum conceivable Soviet (and Chinese) success throughout all the major strategic areas of Asia and Europe would not finally resolve the supreme problem of Communist strategy, viz., how to Communise the United States and subject it to the Kremlin. Moreover, certain major intermediate aims (incorporation of all Germany into the Soviet area, overrunning the whole of Western Europe) cannot be attained except at the risk of an all-out war waged with atomic and hydrogen weapons. The central problem of Soviet world strategy is therefore to press all other activities as far as they can go without provoking all-out war before Soviet forces are ready *and able* to knock out the United States, and then to open an attack on the United States framed in a manner which will minimise injury to the Soviet Union itself. Such a strategy implies knocking out (or securing by political means beforehand) the bases outside the United States from which American air-atomic and/or hydrogen attacks can be launched against the Soviet Union, and also—for both are well-nigh equally essential—destroying most or all of the American long-range bomber force before it can take off (and the American factories which make such bombers). It also implies a Soviet capacity to launch an air-atomic and hydrogen attack which will at least disorganise the United States, and compel it to seek peace on Soviet terms lest worse should follow. An alternative *ultimate* Soviet strategy which will achieve Communist world domination is not apparent. In other words, in an air-atomic and hydrogen age no variant of the Cold War, combined with major war waged with conventional weapons alone, can destroy American military power so long as the American will to resist continues; nor can any such variant and combination therefore achieve Communist world domination.

In certain circumstances Communist success in a major war aimed at world domination is conceivable. The most important conditions are that Soviet air-atomic and hydrogen attacking forces must have the necessary margin of strength and must also achieve surprise (including seizing and holding the initiative) on the necessary scale. A further condition almost as essential is adequate Soviet defensive strength. The large Soviet margin required both for attack and for defence can certainly not be created quickly, or without information and warning seeping through to the West. The great danger to the West is therefore surprise; against which only alertness and the sustained maintenance of the means for air-atomic reply and for defence *on the necessary quantitative scale* alone can—and should permanently—avail.

If this analysis is correct, it is clear that the Soviet Union not only does not now possess the means needed to overwhelm the United States and achieve Communist world domination, but also that, given the necessary American and general Western effort and sacrifice, it will not be able to create them. In this field, however, any Western or American slackness, any false or short-sighted economy, can swiftly and finally prove fatal.

It remains to consider briefly the Western strategy which the present world situation calls for. Here also what Stalin termed "the direction of the main blow" is crucial. For many reasons that main blow cannot and will not be an air-atomic attack *initiated* by the West; and a different strategy and different means must therefore be found. In brief, the West must ensure that the Communist world is increasingly strained and exhausted by its effort to create the armaments needed for world conquest and by the bloodshed and material destruction which its own "small wars" involve. A strategy of this character will make serious demands and impose a grave psychological and political strain on the peoples of the West, who are not accustomed to think in such terms, and whose leaders dislike them also. But a heavy burden of armaments and the prolonged effort which "small wars" involve are better for all concerned than an atomic war, the more so since they must drive Communism back and in on itself, and help to generate the discontents and poisons which in the end can destroy it.

JULES MENKEN

CHAPTER VII

THE NAVAL STRENGTH OF RUSSIA

By Commander Anthony Courtney, R.N.

It is a historical fact that foreign assessments of the real fighting-power of Russia's armed forces have usually been wide of the mark. Naval affairs form no exception to this general rule, and in considering the impression left by the visit of a single Soviet warship to Spithead in June, 1953, it is perhaps salutary to recall the considered opinion of Vice-Admiral Sir Charles Napier, Commander-in-Chief of the Baltic Squadron just 100 years ago, to the effect that the Russian Fleet was "numerically superior to and of greater efficiency than our own." It is a matter of history that this fleet never left the shelter of its coast defences to exchange a single broadside with Napier's warships.

Any assessment of the Soviet Navy's real fighting strength at sea is bound to go wrong if it fails to take into account the grave geographical, climatic, and political handicaps under which the Russian Naval Staff labours in trying to implement the policy of the Soviet leaders in Moscow. This policy has on numerous occasions been expressed unequivocally as the creation of a Russian Navy and Merchant Fleet of a size consistent with the status of the U.S.S.R. as a major world power. Similar aims have been voiced before in Russian history, in the reigns of Peter the First, Catherine the Second, and Alexander the Third, and the Navy which they brought into being was eventually successful in its struggle to dominate the Baltic and Black Seas. But the Russian Navy has yet to prove itself in the face of the forces of a major naval power, and in examining the potentialities of the Soviet Navy in 1954 it is necessary first of all to see whether the age-old handicaps which affected its predecessors have become in any way modified with the passage of time.

In the Arctic, Russia's naval potential has been improved by the construction of a modern naval dockyard at Molotovsk some fifteen miles west of Archangel, and by the adaptation of the sheltered anchorage at Vaenga, in the Kola Inlet, into a major operational base, backed by the dockyard facilities of Murmansk. The ancient Catherine Harbour, now Polyarnoe, at the mouth of the Kola Inlet, serves as a fine, advanced, ice-free base for Soviet submarines and light craft. But the White Sea still freezes up for seven months of the year, during which period the Stalin Canal, which enables destroyers and below to interchange between the White Sea and the Baltic, is also impassable. It is only when we consider the development of the Northern Sea Route to the Far East that we become aware of a real improvement in Russia's strategic position in this area, and the fact that it is now possible to interchange warships between these two areas during perhaps six weeks in the late summer of every year is in itself an immense advance. Nevertheless, Vaenga and Molotovsk, Murmansk and Archangel are situated far from the industrial areas which support them, at the end of tenuous and vulnerable lines of communication, and the increasing complexity of modern warship equipment gives greater emphasis to this serious disadvantage.

The principal Soviet building yards are still in the Baltic, and some improvement in Russia's strategic position in this area is represented by the fact that Libau, used by the Imperial Navy up to 1914, has been superseded by Pillau (now re-named Baltiisk), in what was formerly East Prussia, as the Baltic Fleet's advanced operational base. Apart from this acquisition, the Soviet Navy can obtain excellent repair facilities in the Satellite Baltic ports of Rostock, Stralsund, Dantzig, Gdynia, and Stettin. Nonetheless, the main Soviet Fleet bases in this area are still blocked by ice for five months of the year, and this represents a perennial handicap to the type of sea-training which alone can turn the Russian peasant conscript into an effective fighting seaman. Apart from this, the land-locked waters of the Baltic, the comparative absence of tidal streams, and the excellent navigational facilities available, all tend to militate against the blue-water standard of seamanship required by any navy which aspires to range the oceans of the world; and the bottleneck of the Sound and the Belts, seen in the light of Russia's endemic preoccupation with military "security," is an added discouragement to the despatch of squadrons far afield.

In the Black Sea, the strategic picture has been improved, from the Soviet point of view, by the acquisition of the Danube delta with the return to Russian rule of Bessarabia and the Dobrudja. Against this must be set the havoc wrought to the Soviet naval potential in this area through the destruction by the Germans of the port and shipbuilding facilities at Odessa, Nikolaev, and Sevastopol, to name only the most important of the places affected. The Black Sea, which is comparatively ice-free in winter, offers far better training facilities than the Baltic, though security and political considerations still prevent the Russians from extending the range of their seagoing experience beyond the Dardanelles. The Black Sea, furthermore, remains isolated from the other main fleet areas, although the recent completion of the Volga–Don canal now provides small warships with a means of communication with the Baltic, the Arctic, and the Caspian during the summer months.

The Soviet Far Eastern bases are still hampered, not only by severe climatic conditions of ice and fog, but by the immensely long line of communication which separates them from the arsenals of European Russia. The situation has been eased by the establishment of the Northern Sea Route previously referred to, but nothing short of local naval self-sufficiency can make Soviet sea-power really effective in this area. The ship-building and repair facilities of Vladivostock, Komsomolsk, Nikolaevsk, and Sovietskaya Gavan are not yet of a standard which can stand comparison with Japanese and American naval potential.

This then is the strategic background against which Russia's fleet requirements must be judged. It is at once evident that the four main areas concerned dictate at least three different sets of staff requirements for warship construction if the best use is to be made of the resources available. The Northern and Far Eastern theatres need long-range ocean-going types of warship, strengthened for ice in order to be capable of reinforcing one another in case of need via the Northern Sea Route. The Baltic, on the other hand, requires a very manœuvrable type of surface warship with high speed and superlative defensive characteristics, particularly against air attack, a type which is exemplified by the formidable Swedish cruisers of the Gota Lejon class. The Black Sea for its part needs fast, heavily-armed ships with medium endurance but without the highly-developed sea-keeping qualities made necessary by the conditions of the North and the Pacific, where the Soviet Navy disposes of ice-free ports giving access to the oceans of the world. There is, however, as yet no evidence that the Soviet naval authorities are attempting to modify new construction types in accordance with these local conditions. At least up to 1945 the evidence seemed to point the other way, for the Soviet destroyers operating with the Northern Fleet during the war were of a type which showed distinct traces of Italian Black Sea design and which were far from ideal in the harsh conditions of the northern winter.

The Soviet Fleet of 1954 is unbalanced in its composition when seen from the standpoint of contemporary ideas concerning the application of sea-power. This lack of balance is undoubtedly due in part to the geographical and climatic handicaps sketched out above, and it obliges the Fleet to maintain a close relationship with land-based forces, both army and air, a relationship which cannot be very favourable to the development of a maritime tradition in its western sense. In the course of Russian naval history it seems that the activities of the Fleet have, largely for this reason, been canalised into two principal types of warlike activity to the detriment of the Fleet's proper function as a sea-going force. The first of these roles has been the employment of heavy ships as floating extensions of land positions, as mobile artillery, as layers of minefields which represent the extension of shore defences into the sea, and as a kind of water-borne cavalry capable of turning an enemy's seaward flank. The second, which is closely connected with the first, lies in a special use of light craft which, since the days of the 18th century galley-fleets, have been used unsupported by heavier forces in a semi-military role in coastal waters. In these circumstances it is little wonder that the Russian Fleet has been accustomed to retire under the protection of coastal fortifications and there to immobilise itself when faced by superior naval forces, and it is probably from this habit of mind that there springs the magnificent fighting tradition of the Russian "Marines," the crews of ships which have been thus immobilised and which have been sent to fight on shore, usually in defence of their home ports. As an example of the first role one may quote the employment of the Port Arthur Squadron in the Russo-Japanese War and the use made of the heavy ships of the Baltic Fleet in both the first and second world wars. An example of the second can be found in the operations of Russian torpedo craft in the Russo-Turkish war of 1877, and also in the use of medium submarines in Norwegian coastal waters and of fast light craft and small submarines in the Black Sea during the Second World War. Tradition dies hard in the Russian as in other navies, and the influence of the past is clearly discernible in some aspects of the composition of the present-day Soviet Fleet.

The Russians possess no modern battleships, nor are there any indications that they intend to build more of this type of ship. They probably realise that the era of the "great gun" is at last over, and their three old capital ships, the "Gangut," "Sevastopol," and "Novorossisk" (ex-Cesare) are ample for training requirements until the weapons of the future make their appearance. Meanwhile they have made no serious attempt to develop the interim type of capital ship which has been adopted by the navies of all the other major powers—the aircraft carrier. In 1946, it is true, a tentative and unsuccessful move was made towards acquiring a carrier from abroad. Meanwhile, the uncompleted German aircraft carrier "Graf Zeppelin" was handed over to the Soviet Union, but no attempt was made to bring her into service and she was destroyed in accordance with the terms of the Potsdam Treaty. For years subsequently a mythical "Stalin" was reported to be building or in commission in the Black Sea, but this report has remained quite unsubstantiated.

Since June, 1953, when the new Soviet cruiser "Sverdlov" made her appearance at the Coronation Review at Spithead, it has been clear that the Russian Navy is concentrating on this class of heavy cruiser to supply the backbone of its surface strength in the immediate future. The Sverdlovs are big ships of perhaps 17,500 tons, obviously fast and probably possessing a large radius of action. In one respect at least they seem oddly old-fashioned, in the retention of heavy Italian-type optical rangefinders and heightfinders to serve their not unduly large armament of 12 6-inch guns. It would, of course, be fully in accordance with Russian practice to have dismantled the " Sverdlov's " radar aerials before the ship's arrival at Spithead, and the profusion of canvas screens along her upperworks was certainly reminiscent of the Japanese security measures which were customary on similar occasions before the war. In the circumstances it is at least permissible to wonder whether the Sverdlov hulls are not intended eventually to mount as their main armament the first Russian guided-missile batteries—when these come into service. The "Sverdlovs," which may now number ten, are supported by four ships of the "Chapaev" class, of pre-war hull design and likewise mounting 12 6-inch guns. There are also perhaps eight ships left of the older and smaller "Kirov" class, mounting 7·1-inch guns, which, with the "Makarov" (ex-Nürnberg) and "Stalingrad" (ex-Duca D'Aosta) bring the Soviet strength in modern cruisers to a total of approximately 24. Of these, the Chapaevs and the Kirovs have high speed but insufficient endurance to enable them to operate very far away from their Soviet bases.

As regards destroyers, the Soviet Navy does not yet seem to have reappreciated the tactical employment of this type of ship in the same way as has been forced upon the Naval Staffs of other maritime powers, now that the conventional fleet actions and massed torpedo attacks of our pre-war text books have become things of the past. The Russians have over a hundred of this type of ship, the majority of which are in the Baltic, and as far as is known they are still producing an orthodox Italianate type of very fast, heavily-armed destroyer with a comparatively low endurance mounting 5·1-inch guns. As regards the employment of these ships, the tactical conception which clearly underlies the "Sverdlov" programme would seem to preclude any type of ocean-going "fleet escort" duty, and the heavy torpedo armament still mounted is something of an anachronism if coastal convoy work is envisaged in the Baltic and Black Seas. The armament of these Soviet destroyers seems even more unbalanced if they are intended, which is unlikely, for anti-submarine work, but both in the Baltic and Black Seas—and perhaps in the Pacific also—they would clearly be suitable for minelaying and counter-invasion roles, both of which duties are always to the forefront of the Russian naval mind.

In small ships and light craft the Soviet Navy is undoubtedly very strong, and the fine spirit which animates the personnel of the fast coastal forces in the Baltic and Black Seas is clearly inherited from the men who manned the Russian galley-fleets under Apraxin and Nassau-Siegen in the 18th century. The same probably applies to the crews of the 200–250-ton Maliutki, the small coastal submarines whose role must be primarily defensive. The number of this type may run into three figures, which is a sizeable proportion of the 350 odd submarines possessed by the Soviet Union at the present time.

The Russian submarine arm is numerically very strong, but in the main it still relies on pre-war types which have not yet been superseded in any quantity by the great improvements made possible by the German technical developments since 1939, all of which passed to Russia as one of the fruits of unconditional surrender. Apart from the German U-boats acquired in 1945, most of the 350 boats credited to the Soviet Navy are of pre-war types which fall into three main categories. The Maliutki of 200–250 tons, which have been already mentioned, account for perhaps a hundred of this total, but their endurance at economical speed can scarcely exceed 3,500 miles, and their role in war is clearly a defensive one. The same consideration applies to the Soviet medium submarines of the Shchuka class and its variants, displacing 600/700 tons, of which approximately 100 are believed to exist. The majority of these boats are of endurance comparable to the later "Maliutki," but in the newer "Lin" class some speed is sacrificed for an increased endurance which may be as great as 5,000 miles. Neither of these two main types, however, when operating from Soviet bases in the probable conditions of another war, can be said to represent a potential threat to Atlantic convoy routes, though they could undoubtedly make a considerable nuisance of themselves in the North Sea and in Japanese waters. The third category of ocean-going long-range submarines is clearly the most important from the western point of view. Setting aside the obsolete Pravda and Leninets types, these boats fall into two classes: first, the "S" class of 840/1,000 tons displacement, and endurance of 10,000 miles at economical speed, and a full speed on the surface of 19½ knots. These boats carry 12 torpedoes and are of an orthodox and workmanlike design which, when properly handled, would make them a formidable proposition comparable to that presented by the large ocean-going U-boats of the last war. The second type of long-range submarine is the "K" class of 1,500/2,000 tons with an endurance of 15,000 miles at economical speed. These boats carry 24 torpedoes and have a maximum speed of 22½ knots on the surface. They are of sound, orthodox design, and for commerce raiding far afield their potential value requires no emphasis.

All classes of Russian submarines are designed to carry an alternative armament of mines, which certainly adds to the potential threat represented by the numerically formidable Soviet undersea fleet. It is, furthermore, quite certain that this threat will increase with the entry into service of the first post-war design of Russian ocean-going submarine, and it is equally certain that the new types will bring with them a greatly increased underwater speed requiring a re-appraisal of the anti-submarine methods needed to deal with them.

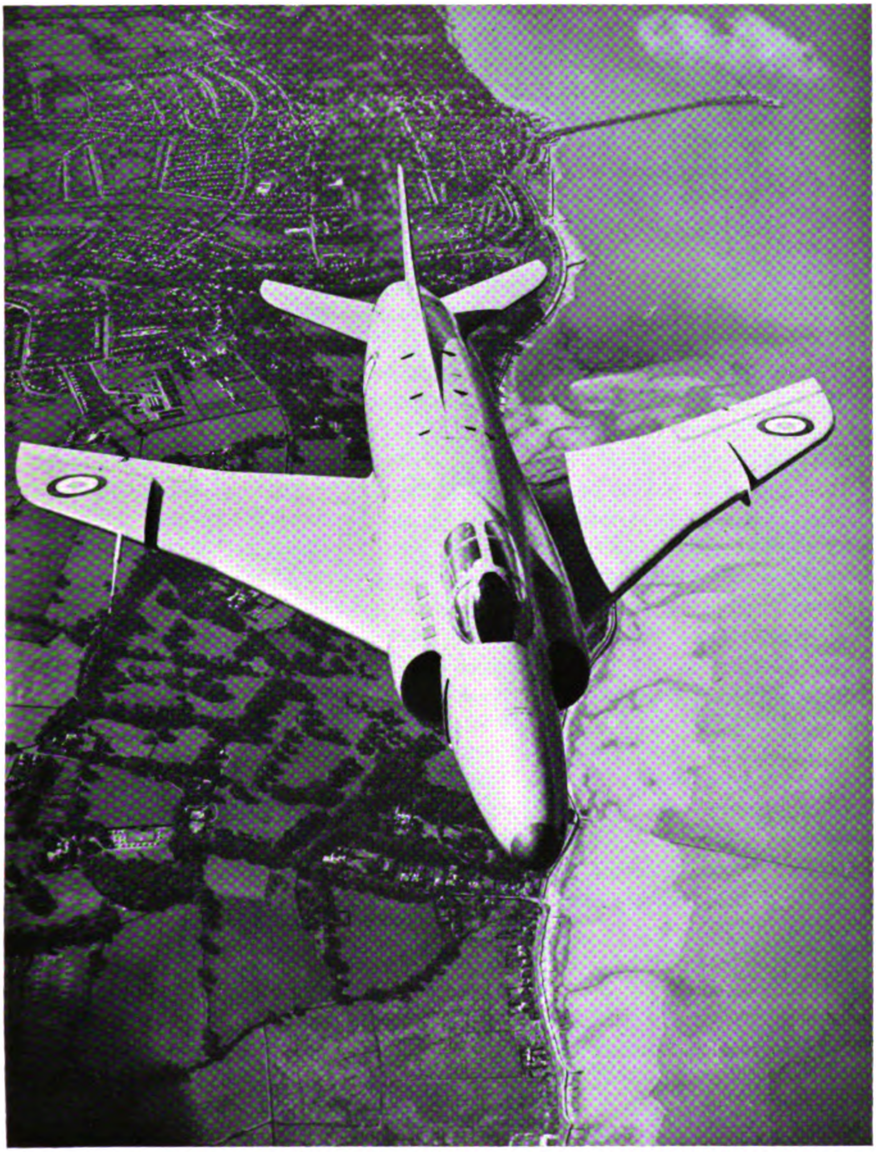
In matter of weapons, the Russians are probably little behind the other major naval powers except in anti-submarine and fire-control gear. They are thought to be weak in electronics, and must be greatly handicapped by the necessity of teaching increasingly complicated modern techniques to ratings whose technological education is unassisted by the kind of mechanical and scientific knowledge gained in the normal course, before they enter the Navy, by the boys of many other countries.

The Soviet Naval Air Force is believed to dispose of some 3,000 aircraft at the present time, all of them shore-based. The efficiency of this force is difficult to assess, but its role must primarily be defensive, a kind of extension of the Soviet Air Force over sea, with the special duty of cooperating with Soviet warships. For this reason it is scarcely to be considered as being in the same category as the naval air forces possessed by powers whose fleets include aircraft carriers.

There is no doubt that the Soviet Naval Staff is making considerable efforts to reduce the handicap to naval training inseparable from climatic conditions which block so many of the Soviet harbours with ice during the winter months. Training in the Baltic must be further handicapped by the relative lack of sea-room and by the extreme measures of concealment by which the Russians have always set such store. Training in long-distance navigation, furthermore, can scarcely be assisted by the political obstacles which stand in the way of visits by Soviet ships to ports abroad, obstacles which spring more from the Soviet attitude than from that of the foreign governments concerned. Trials, particularly of submarines and torpedoes, are believed to be carried out in the Caspian, far from prying eyes, and this must entail a further set of complications when the results are applied to the other four widely separated areas in which the Soviet Fleet operates. For two hundred and fifty years these fleets have been accustomed to a winter hibernating routine, which is still obligatory in all but a small stretch of Soviet coastline, and there is no evidence that this perennial handicap to Russian naval training has been overcome by the Soviet sailors of today.

The bulk of the seamen in the Soviet Navy are necessarily recruited from inland areas and serve for a standard term of five years, a period fixed by the Military Conscription Law of 1939, which is still in force. Discipline is strict and esprit de corps is high by comparison with average formations of the Soviet Army. Out of a total strength of some 750,000 men, a high proportion belong to the Coast Defence and Naval Air Forces, in which both officers and men bear Army rank.

Russian naval officers are almost all "regulars" who are not permitted to leave the Service before the maximum retiring age for their rank. Entry to naval cadet schools, as in the case of the Army, is at the age of 10, and the high pay differential between officers and men is assisting in the creation of an officer class on lines reminiscent of Tsarist days. Political supervision, however, is ensured by means of the system of "Deputy Commanders" which is a slight modification of the Commissar system which achieved a certain discredit in the wars of 1939/40 and 1941/45. There was a joke current among the British officers in North Russia in 1942 to the effect that the Soviet C.-in-C. Northern Fleet was not able



Supermarine Swift Mk. IV, Rolls-Royce Avon turbojet with reheat

to move a minesweeper a hundred yards up the jetty at Murmansk without obtaining permission from Moscow. Though exaggerated, this story illustrates the rigidity of the control exercised on Soviet Flag and Commanding Officers from the centre, a control which, double-banked by the "Deputy Commander" system, allows little scope for initiative. But whatever the failings of the Soviet system as we see it, there can be no two opinions about the courage and fighting ability of Russian officers and men when committed to action, an ability which any potential opponent will underrate at his peril.

The Soviet Navy is in process of expansion, of a nature which has occurred before on several occasions in Russian history. But the Russian conception of sea-power which it represents is not that of the maritime powers of the west, and in the orthodox manner of naval thinking it can still be described more as an extension of land and air power over the sea than as "sea-power" proper. Only in the development of long-range submarines, and perhaps in the "Sverdlov" building-programme can strategic ideas be seen which are akin to those which caused Catherine to send the first Russian Fleet into the Mediterranean, and impelled Rozhdestvensky to lead his gallant squadrons to annihilation at Tsu-Shima. Since 1946, the Soviet Navy has again been subordinated to the Ministry of Defence where, in Russia, the voices of the soldiers are inevitably predominant. Russian sailors and engineers are making great efforts to overcome the cruel handicaps of geography and climate which hinder their country's access to the sea, but Soviet politicians as yet show no inclination to relax the controls which stifle initiative in their naval commanders. In point of numbers, the Soviet submarine fleet alone must necessarily cause disquiet among those western nations whose life depends on the security of their sea communications and who remember the havoc caused by the operations of 57 German U-boats at the outbreak of the Second World War. Nevertheless, all these various qualifications must be borne in mind when any serious attempt is made to assess the strength of the U.S.S.R. at sea.

ANTHONY COURTNEY

CHAPTER VIII

COMMUNIST AIR FORCES

By Asher Lee

SINCE THE end of World War Two, there has been great technical progress in the Soviet Air Force and in those of her chief air satellites in China, Czechoslovakia, and Poland. The Communists have developed jet fighters and bombers, early warning and airborne radar, rockets and guided missiles as well as the atomic and hydrogen bomb. Much of the progress is due to German influence. It would be hard to overstate the Soviet technical air debt to Germany in the immediate post-war years.

In the field of electronics, which is crucial for all modern air operations, either offensive or defensive, the Soviet debt is particularly heavy. Until 1945, Russia had no radar early warning system or other radar equipment. She relied on sound detectors, an observer corps, and long-range wireless intelligence as her first line of defence against raiding bombers. Fortunately, her air defences were never really tested in World War Two. The German long range bomber effort against Moscow in the summer of 1941 was moderate and half-hearted. The 1943 Luftwaffe attacks on Soviet tank and synthetic rubber factories were sporadic and quickly faded out. It was a great stroke of technological fortune for the Kremlin, when the Red Army overran German radar factories and night fighter bases in the last six months of the war. As a result they captured much Luftwaffe radar equipment such as the airborne Naxos and the Wurzburg long-ranged early warning radar, as well as a number of experienced operators who were set to train the first Soviet radar signals units formed in 1946. In addition, many thousands of German electrical engineers who had worked for Siemens, Askania and Telefunken in factories in Eastern Germany and Poland were taken to the U.S.S.R. and helped to start the large scale production of Soviet radar equipment.

This Soviet-made radar equipment has already demonstrated in the Korean war that it works effectively under combat conditions. Chinese fighters may not have inflicted crucial damage on raiding United Nations bombers, but their early warning equipment enabled them to be airborne in time to do so. Soviet early warning radar has been in action in the successful interception of American planes on the Baltic, off the Far East Maritime Provinces, on the Czech border, and in the Berlin area. Airborne radar has been successfully fitted into the latest MIG day fighters and TUPOLEV night fighters and radar gun-sights will become standard equipment in the next year or so. Thanks to German prototypes, the Soviet Union has been able to develop guided missiles, though they are still in the experimental stage and fully operational units are not expected to emerge before 1955 at the earliest. The whole range of Luftwaffe and German army guided missiles fell into Russian hands when the Soviet captured Peenemunde and the experimental guided missile bases in Poland. There were the two Henschal radar guided bombs, the Hs 293 and the larger FX 1400, which were used successfully against both British and American ships in 1943. The U.S.S.R. also acquired samples of German anti-aircraft guided missiles like the X4, the

Hs 298 air to air projectile with a range of about a mile and a half, the ground-launched Rheintochter, fitted with a proximity fuse, and the very promising Schmetterling, which even in 1945 had an operational ceiling of over 45,000 feet and a planned radius of action of up to 20 miles. It could be ground- or air-launched and was one of the most advanced of the German small-calibre radio-guided defensive rockets. German technicians, such as Dr. Tellman, returning from the U.S.S.R. have given details of how the Soviet have developed these missiles at Kuibishev, Irkutsk and Tomsk. Aircraft and electronics firms in Riga, Leningrad, Kiev, Khabarovsk, and Voronezh are reported to be making equipment for radio guided missiles. It would be wrong to assume that the U.S.S.R. is very far behind the West in the development of these weapons.

There is also a body of evidence that large scale production of flying bombs and large rockets based on the German V1 and V2 models is going on in the U.S.S.R. near Moscow, Kazan, and Tomsk. Eye-witness accounts have reported a two-stage Russian rocket which has increased the range of the V2 from less than 300 miles to nearly 500 miles. Experimental radio guided work is going on with these large rockets in the Baltic. The signals have been provided from adjacent Russian surface vessels and are of course only effective for part of the rocket's trajectory. All in all, the Communists have made great strides in making and using electronics equipment of all kinds in the last five years, including jamming equipment, and already factories in Poland and Czechoslovakia are beginning to produce the complete range of Soviet radio and radar equipment including parts for guided missiles.

During the past five years or so, the Communist Air Forces have not only been developing technically, but also increasing in size. In 1947, official and unofficial estimates of Soviet Air Force strength ranged round the figure of 15,000 operational aircraft. To-day the figure most frequently quoted in London and Washington ranges about 20,000. But much more important than bare aircraft statistics is the flesh and bones of the organisation and the operational strengths and weaknesses. The Soviet Air Force is not an independent military arm like the Royal Air Force or the United States Air Force. The bulk of its squadrons are organised into air regiments, divisions and corps, subordinate to the local army command. The current strength of the tactical air forces is about 10,000 operational planes. There is also a separate naval air arm, consisting of fighter reconnaissance and torpedo bomber squadrons, controlled operationally by the Soviet Navy. There is a strategic Long Range Command which, according to the latest American Intelligence estimates, has a strength of over 1,000 long range bombers, mainly four-engined Tupolev planes with an increasing number of four-jet and six-jet bombers designed jointly by Tupolev and Ilyushin. This Air Command also includes some four-engined Ilyushin transport squadrons, and is directly subordinate to the Supreme Defence Council. Finally, there is the Air Defence Command, which includes the equivalent of both the British Fighter and Anti-Aircraft Commands.

Of these various air arms, the tactical forces subordinated to the Army are by far the most powerful, experienced and best trained. Some two-thirds of the force comprises squadrons with modern jet fighters like the MIG 15 and short range bombers like the twin jet Ilyushin 28 and the twin jet Tupolev 10. Soviet Army support air regiments are mobile and equipped with modern wireless and radio telephone equipment. The Western powers have much weaker tactical air forces to oppose them. They may close part of the gap by superior flying skill and American tactical atomic weapons, but the Soviet Union continues to improve its air equipment. Later versions of both the MIG 15 and Ilyushin 28, with engines of up to 8,000 lbs. static thrust and more sharply swept wings, were in squadrons early in 1954. Both the fighters and fighter bombers were heavily armed with four 30 mm. Khrumichev cannon. It can be reasonably assumed that 1954 is the year in which supersonic fighters were first introduced into the Soviet Air Force in large numbers.

In the past five years, Soviet air strategy has had to be modified in three principal aspects. Much greater emphasis has had to be laid on strategic bombing, strategic fighter defence, and co-operation with the navy. During the last war the U.S.S.R. was relatively weak in all three departments, but it did not seriously handicap the overall Soviet military strategy. The Anglo-American strategic bomber force attacked many of the target systems which were on the list of the weak obsolescent Soviet long range bomber units, such as German oil and aircraft centres and targets in Berlin. The Soviet Navy did not sortie from the confines of the Baltic or the Black Sea into the wide ocean spaces. The Soviet mine-laying, torpedo-bomber and anti-shipping bombing effort was too small to have any major effect on the naval situation, but it did not matter, for the naval opposition to the U.S.S.R. in the Baltic and the Black Sea was negligible. As for Soviet strategic fighter defences, they were never fully tested and never fully organised.

Now the whole emphasis of Soviet air strategy has been shifted by world events. Soviet submarines must be trained and equipped for sorties into the Atlantic, Pacific, and Indian Oceans. Now that their hunting grounds are global, they will need a full measure of long range air reconnaissance if they are to be fully effective. The Soviet Union has no operational experience of any kind in this difficult field of air operations. Despite all wireless and radar aids, long range trans-ocean flying calls for a high standard of training and personnel. The Soviet long range units were noticeably weak in this department in World War Two, and this may well be the Achilles' heel of Communist Air Forces as a whole. Despite many tempting targets on land and sea, the North Korean and Chinese Air Forces operated no long range reconnaissance or bomber squadrons throughout the Korean War. The Soviet have no aircraft carriers ready for operations and are unlikely to build any numbers of them. They will rely for long range ocean reconnaissance on sorties from cruiser-borne catapulted aircraft and on the general resources of the Soviet Long Range Air Command. This Air Command is more flexible in many ways than the strategic bomber forces of either Britain or the U.S.A. In World War Two, Soviet long range bombers switched to tactical support bombing and to emergency transport work with great facility and despatch. They are now working much more closely than ever before with the Soviet navy and, in particular, with its ocean-going submarine arm.

But the Soviet Strategic Bomber Force, although numerically strong, is qualitatively inferior in nearly all major aspects of long range air warfare to the American and British strategic bomber forces. Russia has no equivalent to the American B 52 strategic eight-jet bomber or to the American piston-engined B 36. Many of the Soviet Long Range bombers are still conventional heavy bombers, which have a performance similar to R.A.F. Lincolns or U.S.A.F. B 29 Superfortresses. Later versions are equivalent to the American B 50. By present day standards they are slow and obsolescent and highly vulnerable in daylight to fighter attacks by U.S. Sabres or British Hunters and Swifts, or indeed any modern jet fighter. These Soviet bombers also have not the range to penetrate to most of their vital targets in the North American continent. It is true that the U.S.S.R. has evolved a form of flight refuelling similar to the British and American system, but under combat conditions this might be a risky manœuvre. There is no evidence that Russia is planning any one-way suicide bombing attacks on the U.S.A.—a sort of Soviet equivalent to the Japanese Kamikaze. But the U.S.S.R. has a few squadrons of four-jet and six-jet bombers ready for operations and several squadrons of longer ranged Tupolev conventional four-engined bombers, which have a maximum radius of action of some 3,000 miles. It is fairly certain that Russia will produce a large force of really long range jet bombers in the late 1950s, but until she does, her numerical advantage over the U.S.A.F. and R.A.F. heavy bomber forces will not be significant. The U.S.S.R. has only a small stock of atom bombs (perhaps a hundred or so), compared with the substantial American stock-pile. She has no experience in the use of radar bomb sights and radar navigation, so vital in night and bad weather bombing operations. Her experience of radio countermeasures is very limited. In fact, the U.S.S.R. has only a restricted first-hand knowledge of most of the modern problems of long range bombing. She has done much to strengthen and modernise her strategic bomber arm during the past five years, but much remains to be done. It may be that guided rockets fired from long range ocean-going submarines will in the future form a valuable auxiliary to the Soviet long range bomber force. There is evidence that firing trials of this kind have already been carried out in the Baltic.

The need to provide for the expanding heavy bomber force has impeded the build-up and modernisation of the air transport command. Russia is building no jet transports as far as is known. To meet her practical requirements in war she would need a force of at least 5,000 transport planes. She has about half this number at the moment. The U.S.S.R. needs a large number of transport planes because her rail and sea communications are highly vulnerable to bombing, because she must keep several hundred planes to lift her parachute divisions, and because she must be ready to switch her air forces from one front to another at short notice. Ilyushin is the chief designer of the post war Soviet twin- and four-engined transport planes. Much of his current transport aircraft production has to go to meet the needs of the satellite military and civil requirements.

Russia's biggest air problem is that of strategic defence. It is almost certain that because of this her tactical air forces will be unable to expand and may well contract in the next few years. In the last year or so the U.S.S.R. has built a rocket fighter, which would be suitable only for strategic defence, and most of the latest MIG jets are going into the units of the Protivodushnaya Oborona, as the strategic defence command is called. The efficiency of the strategic air defences of the U.S.S.R. will vary enormously from day to day and from target area to target area. To protect targets such as Leningrad and Baku may mean the interception of an enemy rocket flying at over 3,000 m.p.h. fired from a submarine without warning. To protect her atomic plants near Irkutsk in Central Asia is an easier task. The U.S.S.R. has to intercept subsonic bombers which will give her air defences over 1,000 miles of warning on the radar screen and have to fly unescorted to the target most of the way. Russia's great distances, that foiled Napoleon and Hitler, are a mixed blessing to her air defences. They do provide the means of plenty of early warning to provide defence in depth—but what a vast area to police! This great Soviet air defence problem is a factor for peace in the age of hydrogen and atomic bombs. The Soviet rail transport system is especially vulnerable to air attack. No one in the Kremlin thinks they can protect Moscow from a devastating air calvary. These things will always give the Soviet air planners and politicians food for thought.

CZECH AND POLISH AIR FORCES

The Czech and Polish Air Forces are by far the strongest of the Soviet Union's aviation allies in Europe. Their development as Communist Air Forces has much in common. The origins go back to 1943, when both Czech and Polish air squadrons were formed on Soviet territory to fight against the Luftwaffe on the Eastern front. Both air forces are organised almost entirely for tactical operations, consisting as they do of fighter and fighter bomber squadrons with a modest complement of reconnaissance and transport aircraft.

The immediate post-war Czech Air Force had a fairly high standard of morale and training, but encountered enormous difficulties in finding aircraft for their air units. The Czech aviation industry had been developed by the Germans from 1939 to 1944 and was ravaged by war from 1944 to 1945. For the early post-war years, the Czech Air Force consisted of a harlequin mixture of obsolescent Yakovlev and Lavochkin fighters of Soviet design, some Ilyushin and Tupolev fighter bombers, some obsolescent German Arado and Siebel trainer aircraft and a few squadrons of Spitfire and Mosquito aircraft supplied by Britain.

In February, 1948, the situation in Czechoslovakia changed violently. The Communist "coup," engineered by the Kremlin, was followed by a major purge in the Czech Air Force. Something like fifty per cent of the corps of senior officers was dismissed because they had British wives, or had served in the R.A.F., or were suspected of sympathies with the West. The quality of the Czech air staff was diluted for at least a decade by the loss of men of the calibre of General Karel Janousak, C.-in-C. of the Czech Air Force in Britain from 1940 onwards, or men like Colonels Schneider, Nowak, and Tanawi. Dozens of Czech airmen now began to leave their country by air with the help of a well organised underground escape movement. From these escapees, who have included flying instructors, MIG 15 pilots and radar technicians, it is possible to construct an intimate picture of Czech Air Force developments of the last two or three years. Add this to other evidence, and a fairly reliable picture of the fighting value of the Czech Air Force is obtained.

It is quite clear that discipline and political indoctrination is very tough. Some of the latter inevitably fails to hit the mark. There is evidence from a number of training schools that when the party line is read out at the indoctrination classes, it often provokes a form of earthy hilarity from the young Czech airmen who are listening. On the other hand, failure to pass the examination in Soviet history and politics means demotion and reduction to the ranks. Moreover, the study of Russian is compulsory, as it is becoming the standard language for radio telephone communication. Punishment in the Czech Air Force is strict. At flying training schools, minor misdemeanours, e.g. dirty rifles or failure to salute an officer, can mean the loss of week-end passes for as much as several months. Bad landings and even inevitable crashes are often punished by on-the-spot loss of rank. However, once a Czech pilot takes off in an aircraft he loves and trusts, the stringencies of politics and discipline are quickly forgotten.

The number of Czech Air Force men who have escaped to the West in the last year or so has been small. There are several factors contributing to this within the Czech Air Force. The quality of food and standard of living conditions are improving. At one time there were great difficulties in flying training. There was a shortage of aircraft and aircraft spares, which kept aircrews grounded for weeks during spells of good flying weather. But now the Czech Air Force is making substantial numbers of its own trainer planes based on Arado and Siebel German designs, it is being supplied by Poland with the ZAX trainer, and it is making its own designs of Sokol and Aero trainer machines.

The situation in operational training aircraft is also much more satisfactory now than two years ago. Then a number of Czech pilots had to complete their training in the U.S.S.R. Their relationships with Red Air Force flying instructors were not always happy. In operational training they were limited to obsolescent jet planes like the German Messerschmitt 262 or the Soviet Yak 15 single jet or the MIG 9 twin jet. Flying out of date German and Soviet machines made some of them feel like neglected Cinderellas. But now nearly all operational training takes place in Czechoslovakia and the squadrons are getting increased numbers of MIG 15s and Tupolev and Ilyushin twin jets. Since the summer of 1952, the Czechs have been assembling their own jet planes and modern Ilyushin transport machines at aircraft factories near Prague and Bratislava. Czechoslovakia is now making small numbers of its own jet aircraft based on Soviet designs. It has begun its own electronics industry for radar wireless and radio telephone equipment. It has a factory in Slovakia near Dubnitsa making parts for guided missiles.

What then is the strength and fighting value of the Czech Air Force? Numerically its front line squadrons will increase in size from its present strength of about 600 aircraft to some 750 planes in a year or so. Most of these will be organised into fighter and fighter bomber regiments on the Soviet pattern with 30–40 planes per regiment. The Czech Air Force will have two main roles—to support the ground divisions in the field and to provide air defence against bomber attack on railway centres, factories, and above all, the important Czech uranium mines. The Czechs must also provide part of the outer air defences of the U.S.S.R. Czechoslovakia has a growing force of parachute troops but is unlikely to be able to use them in more than regimental strength, at any rate, for a year or so. They have been proudly displayed in the annual air manœuvres and have shown the stamp of being trained in the U.S.S.R. There is little chance of the Czech Air Force developing a long range bomber arm in the foreseeable future. They may, however, develop a squadron or two of long range reconnaissance machines fitted with Soviet Ilyushin four-jet aircraft to supplement the very few squadrons of tactical and reconnaissance planes they have at present.

The Czech Air Force is gradually becoming modernised and fully integrated as a satellite of the Soviet Air Force. The standardisation of equipment, radio telephone procedure, the close similarity in ground staff organisation and training methods facilitate this procedure. We must expect the Czech Air Force to increase in strength, perhaps up to 1,000 operational aircraft in squadrons, in the next two or three years. This would probably consist of a tactical air force of nine or ten air divisions each of two to four air regiments. The strength of each regiment will be about thirty-five aircraft and most of them will be fighter regiments fitted with jet planes capable of 650 to 760 m.p.h. The Czech Air Force units are, at the moment, under strength like many of the units in the Hungarian, Roumanian, Chinese, and other satellite air forces of the U.S.S.R. But the aircraft supply situation will improve for them.

In brief, there is no reason why the Czech Air Force if called to battle should not give as good an account of itself as some of the member air forces of N.A.T.O. whose size is comparable.

POLISH AIR FORCE

Polish Air Force development has been similar to that of the Czech Air Force in almost every technical and tactical respect. Some of the similarities have already been pointed out. The most important difference between the two air forces is political. Ever since 1943, when the first Polish Communist air squadrons were formed in U.S.S.R. territory, the Commander-in-Chief of the Polish Air Force has been a Soviet general. The first during the war against Germany was General Polynin. He was followed after the war by the Soviet General Romeyko and later General Turkiel. In addition a large number of senior officers are ex-Soviet Air Force pilots. There are also more Soviet liaison and political officers working with the Polish Air Force than with the Czech Air Force. In fact, Soviet control over the Polish Air Force is virtually complete.

Aircraft production in Poland expanded during World War Two. Heinkel bomber production and Focke Wulf fighter production were established there when the Anglo-American bomber offensive against Western Germany was stepped up. But war damage and post-war dislocation put the clock back. It is only in the last two or three years that Poland has been producing a substantial flow of trainer and jet aircraft mainly at the two big factories at Rzeszow and Mielec. Even now many of the parts and engines for the Polish assembled MIG. 15s come from U.S.S.R. factories. It is unlikely that the Polish aircraft factories are turning out more than 100 aircraft a month of all types.

Many units in the Polish Air Force are well below statutory strength. Instead of the planned 35 aircraft they have only 25 and in some cases even less. The total establishment strength of the Polish Air Force today is about 1,000 aircraft but the actual strength of operational aircraft in units is only about 700 aircraft. There are on paper ten fighter divisions each with two or three regiments. In addition a tactical air force is planned with about four air divisions. This force will take its fighters from the main fighter force and in addition have three or four tactical bomber regiments and a reconnaissance regiment. It will take at least a couple of years to bring the Polish Air Force units up to strength and to modernise them. Many of the jet fighter squadrons are still fitted with obsolescent Yak jet aircraft and few of the tactical bomber squadrons are fitted with the latest modern Tupolev and Ilyushin twin jets. There is no indication yet that it is planning a long range bomber force. Like the Czech Air Force, its main functions will be the tactical support of ground divisions and the air defence of Polish targets and of Polish territory as part of the outer defences of the U.S.S.R. The radar units of the Polish Air Force are closely linked with the main early warning system of the U.S.S.R. As in the case of the Czech Air Force there is a standardisation of wireless equipment, radio telephone procedure, combat training, in fact, of all aspects of tactical air power and air defence. Polish air squadrons will give a good account of themselves in co-operation with the Soviet Air Force. Poland is the most important of the Soviet air allies in Europe. If asked to fight, Polish pilots will fly with the traditional bravery and skill which made them outstanding even among the high grade personnel from many nations in the Royal Air Force. The U.S.S.R. keeps the closest control over the Polish Air Force because she has something worth looking after.

CHINESE AIR FORCE

Numerically the Chinese Air Force is the largest of the satellite air forces of the U.S.S.R. In relation to its operational responsibilities it is by far the weakest. For many years to come, the Chinese Air Force will be incapable of offering systematic air defence to protect China's vast metropolitan territory from air attack. This weakness was underlined in the Korean war when the Chinese fighter squadrons and anti-aircraft guns had the job of defending the power plants, bridges, and airfields near the Yalu river. The Chinese Air Force had several hundred MIG 15s based in the area, a much greater concentration of fighters (and guns) than they are ever likely to be able to afford in defending any area of metropolitan China. They were aware that United Nations bombers and fighters must return again and again to this same target area. Thus their early warning system had plenty of practice in detecting the height, direction, and strength of the raiding aircraft. They had the advantage too of batteries of radar controlled anti-aircraft fire. But when the raiding Superfortresses turned from day bombing to night bombing, Chinese night fighter reaction was negligible. And in daylight their air defences had no effective reply to the combination of bomb-carrying Thunderjets escorted by Sabres. It is true that the Chinese air defences will not have to cope with such a strong combination deep into metropolitan territory. But the record of air defence in Korea suggests that the Chinese Air Force cannot offer a deterrent to raiding bombers and is unlikely to be able to do so for many years over most of her border and maritime territories at any rate.

The radical weaknesses of the Chinese Air Force are many. They have no modern aircraft industry of their own. Their factories in Manchuria are making conventional trainer aircraft of Soviet design as well as twin-engined transport aircraft based on an Ilyushin model. It will be several years before they can produce modern jet planes from their own factories in any numbers. Meantime they must rely almost entirely on Soviet factories to supply their air force which has an operational strength of over 2,500 planes including 1,500 to 1,750 jet fighters. A few squadrons of jet bombers fitted with Tupolev and Olyushin twin jets are being formed. But the Chinese army, as in the Korean war, will have to fight with very limited air support in the foreseeable future. In hilly terrain, as in Korea, the troops can dig themselves in and have shown that they can fight well in the face of considerable air bombing and with a minimum of commissariat. On other battle fronts, in more open territory, they would probably be more vulnerable to air assault and the weakness of the Chinese Air Force would be more apparent.

One of China's major air problems is to produce a generation of air technicians and high calibre air crews. Time and again over Korea the inferior tactics of the Chinese fighter pilots prevented them from using the qualities of the MIG 15 to full advantage. Frequently a flight or squadron of Chinese planes was in a favourable position tactically but failed to make an effective attack on United Nations aircraft. Only the flying instructors and the elite operational pilots presented a threat to the raiding bombers and a high proportion of these lost their lives in the Korean air battles. The U.S.S.R. is offering full training and technical educational facilities to the Chinese Air Force. But there will be the same difficulties in producing a large number of skilled air crews and trained ground staff as in the case of other Asiatic peoples. Technology proceeds slowly eastwards.

Because of these personnel difficulties it will take another decade to produce a really effective long range bomber force and nearly as long to produce an adequate reconnaissance force. During the Foreign Ministers' conference in Berlin in February, 1954, it was reported that Russia had given China a stock of atomic bombs and was training Chinese airmen to fly the latest Soviet bombers. The statement was reported to come from Mr. Molotov and was no doubt designed to include China in international conferences on the control of atomic energy and armaments. It would also impress on the West that the U.S.S.R. has atom bombs to spare. This is not likely to be true for a year or two. At the moment Russia cannot, in any case, afford many of her long range jet bomber planes for any of her satellite air forces either for bomber or reconnaissance operations. If China can produce a force of half a dozen squadrons of medium-range twin- or four-jet bombers in the next year or so it will be as much offensive air power as she can reasonably hope for. There is no sign yet that China is developing guided missiles either for offensive or defensive purposes. She will slowly develop a signals organisation under Soviet tutelage to enable her to man a metropolitan early warning system. But she has no serious electronic industry of her own yet and, without one, it is difficult to see how China can operate a modern air force effectively. China is forming a body of parachute troops but is not likely to employ more than a division of them in the next few years.

Many of the basic weaknesses in Chinese air power will no doubt be eliminated in time. China will get the maximum help from the U.S.S.R. to speed the remedies and may in the 1960s produce all her own aircraft and technicians. Until then, she must remain a third rate air power with first class commitments. She may be able to give token air supplies to the rebels in Indo-China or to deal with Chiang's Formosan Air Force in combat. But as one of the great powers, China lacks an air force to back her political arguments. In Asia this may limit her strategy more than any other single factor.

ASHER LEE

CHAPTER IX

WESTERN EUROPE AND THE PROBLEM OF MOBILE DEFENCE

By Colonel the Hon. E. H. Wyndham

It has often been said that armies in peace time prepare and train for the last war, instead of for the next. It must be admitted that there has often been good ground for the accusation. It was certainly true of the British Army during the greater part of the nineteenth century, and it was equally true of the French Army in the period between the two world wars. But it is certainly not true today.

It is also important to bear in mind that no war ever starts where the previous one left off. In the intervening period of peace some change of material or tactical thought is sure to have occurred which will affect the early stages of a war. Likewise, the climate or nature of the country in which it is fought may differ widely from those of the previous war and accordingly impose different conditions.

The last war ended on a revolutionary note: the atomic bomb. This alone made it certain that any future war would differ widely from its predecessors. This fact has since been powerfully reinforced by the development of jet aircraft, rockets, and guided missiles, to say nothing of hydrogen and cobalt bombs. Thus the tactical lessons of such episodes of the last war as the blitzkriegs against Poland and France in 1939–40 are today almost as out-of-date as the Charge of the Light Brigade.

In attempting to foresee what a future war may be like, we shall also probably be well advised not to pay much attention to the tactical gospel according to the Western Desert. This campaign had peculiar features of its own which rendered it unique, and the conditions under which it was fought are unlikely to be reproduced again. Its peculiarities were due to the fact that it was fought in country which lacked tactical features and obstacles to movement, and was likewise deficient in permanently established communications such as railways. But as an example of how the future is likely to differ from the past, it is only necessary to consider for a moment what would probably have happened in the campaign in the Western Desert had both sides been in possession of cobalt bombs. The gamma rays emitted by radio-active cobalt are three hundred times more intense than those given off by radium. If an ordinary atomic bomb is coated with cobalt, when it explodes a vast cloud of radio-active dust is produced which may remain dangerous, if not lethal, for a period up to five years. It is easy to imagine the revolutionary effect upon the campaign which would have been produced if such bombs had been dropped on carefully selected places in the desert.

In view of all the welter of change in which we live today and which makes any prediction as to what may happen in the future extremely hazardous, in writing a chapter of this sort it is necessary to make certain preliminary assumptions in order to establish a basis from which the argument can be developed. It seems best, therefore, to adopt the assumption made in the *Statement on Defence 1954*, issued last February, that the next war will probably start with a period of intensive atomic bombing by both sides. It may be well here to state that throughout this chapter the term "atomic bombing" is meant to include hydrogen and cobalt bombing. If this opening phase does not lead to a definite decision, it will be followed up by a period of broken back warfare on land and at sea in which the air will play a less dominant part than in the first phase. We must, of course, also assume that the opening atomic phase will have seriously weakened the industrial power of both sides, and possibly have particularly injured the N.A.T.O. powers by rendering many of the Western Europe ports unusable and accordingly seriously complicating the problem of reinforcement and supply.

Before leaving this assumed opening stage of the war, it will be well to reflect for a moment on the problems which will face the statesmen of both sides in deciding on the policy to be adopted as regards the use of these new devastating weapons. It is obvious that the decision as to when and where atomic bombs are to be dropped must always be as much a political as a military one. For example, it is possible to imagine that the popular cry of the next war might be on the one hand to "liberate" the West from Capitalism, and, on the other hand, to "liberate" the East from Communism. But surely no-one would wish to liberate large tracts of country which had been rendered desolate and practically uninhabitable by atomic bombing.

Statesmen will surely have the sense to look ahead and consider the situation which they wish to establish at the end of the war, a task which the Western Powers, with their slogan of unconditional surrender, failed to perform in the last war—a mistake which was not made by the Soviet Union, with results from which we have been suffering ever since. As an example of the sort of thing over which clear-headed foresight is necessary, it may be remembered that at one time, in our obsession for unconditional surrender, a plan was suggested for removing all heavy industry from Germany after the war and turning her into a purely pastoral country, but when this idea was closely examined it was realised that the complete elimination of the industrial area of the Ruhr would have a devastating effect upon the economy of many of Germany's western neighbours. It would, in fact, have injured the victors almost as much as the vanquished.

Turning to the second phase, in which we assume that sea and land operations will hold the centre of the stage, one is at once confronted by the difficulty that we know so little about the newly invented weapons which will be available, such as atomic artillery, guided missiles, recoil-less guns, etc., that one man's guess as regards the probable tactical course of the war is as good as another's. However, in all this kaleidoscopic situation one thing remains constant: the human element. Human reactions to war remain the same through the ages, although the last war proved that man's powers of resistance are greater than our forefathers would have believed possible. Likewise, certain fundamental principles of war do not vary. For example, victory can only be achieved by offensive action, which depends on gaining and maintaining the initiative. Lack of initiative through unpreparedness or other serious weakness (the usual fate of the British Army at the start of a war) may impose a defensive policy; or, alternatively, it may be necessary to adopt a defensive attitude in one quarter of the theatre of war in order to concentrate the strongest possible forces for offensive action elsewhere.

If a defensive policy has to be adopted, it can never hope to succeed if it is passive. Only by adopting an offensive defensive can the morale of the troops and the chances of wresting the initiative from the enemy be maintained; in other words, defence must be mobile.

Before going further, it will perhaps be as well to clear our minds as to what exactly is meant by mobile defence. The words "mobile" and "defence" can be made to apply to situations very different from that which this chapter seeks to expound. For example, an army in headlong flight is certainly on the defensive, and is mobile in the sense that it is moving; but to describe its operations as mobile defence would obviously be misleading in the extreme. Likewise, the term cannot really be fairly applied to a defensive plan which consists in maintaining a mobile reserve which spends its time rushing about to plug holes which have been punched in the static defence line held by the rest of the force. The true definition of mobile defence is the employment of mobile troops to force an attacker into such a position that he can be struck a really hard blow when off balance, and accordingly be deprived of the initiative. This is the problem which is discussed in the following pages.

Next, in spite of what has been said above about our lack of knowledge of their potentialities, we must try to think out what effect these new weapons, so far untried in European war, may have upon the defence. Does the immensely increased power which they possess favour the defence or the offence?

During this second phase of the war the atom bomb will still, of course, be a constant threat, and it is clear that anything in the nature of a large concentration of troops forms an ideal target for it. Therefore all future tactical plans will have to be based very much more on dispersion than has hitherto been the case. This is a situation that an alert, well thought out system of defence might be able to exploit. A threat by mobile armoured forces to some important feature on the attacker's line of advance might force him to concentrate a portion of his forces and give a target to the atom bomb.

But the main advantage with which the atom bomb endows the defence is that the defender does not contemplate advancing into his opponent's territory, at all events for the time being, so that while, as has been pointed out above, discretion will always be needed in the use of atom bombs, the defence does not necessarily have to look quite so much into the future as does the aggressor in this matter. The future operations of the defending side cannot be hampered by the results of atom bombs dropped behind the opponent's line; but this is not true in the case of the attacker. The defending side can therefore use these missiles as freely as its stock of them permits to attack the communications of the opponent and accordingly slow up his advance, thus improving the prospects of success for a mobile counter-offensive.

We do not at present know enough about rockets and guided missiles to be dogmatic on what the effect of their use is likely to be in the future, but it is clear that anything which increases the volume and accuracy of fire in war will tend to favour the defence. It was the superiority of fire which caused the stalemate of the First World War, and it would seem that in the years that have passed since the end of the Second World War the tendency has been for fire to regain its former superiority over movement, a fact which is likely to favour the defence in a future war. A word may be said also about the recoil-less guns which are surely likely to develop in the future. Being much lighter and more easy to conceal than their predecessors, they would seem to favour both the offensive and the defensive, and may accordingly tend to cancel themselves out.

The never ending struggle for supremacy between armour and fire power still continues. At the moment fire power seems to be in the ascendant, but the use of new alloys and, possibly, plastic substances in the manufacture of armour may still redress the balance.

At the same time, the great development in new types of hand-operated short range anti-tank weapons must have an effect on the tactics of armoured forces, whose best defences against them are speed, manœuvrability, and surprise.

It is probable that in any future war commanders will be less sensitive than they were in the last to deep penetration of tanks on their flanks and in their rear. After all, it follows that if the enemy is behind you, you must *ipso facto* be behind him. The commander who has kept his forces balanced and distributed on sound tactical principles has no reason unduly to fear such attacks unless he allows himself to be taken completely by surprise. Another point to be borne in mind is that it is quite certain that both sides will concentrate on doing as much damage as possible to the fuel supply of their opponents. The first phase of atomic bombing will probably have done a good deal in this direction and there is unlikely to be much relaxation of effort in the second phase. It is just sheer nonsense to suppose that armoured forces will be rushed about the theatre of war as if their motive power was supplied by a magic wand.

It will, perhaps, now be of interest to consider the problem from the point of view of possible operations in the North German plain. This is the historic highway by which armies have always advanced from east to west or west to east across Central Europe. It is also the sector which would be defended in any future war by the northern group of the central command of the N.A.T.O. forces, composed of the British, Dutch, and Belgian contingents. We will assume that neither side has complete air superiority, but that both are sufficiently strong to be able to establish local air superiority when it is essential to the tactical plan. We may also assume that the task allotted to these forces would be to delay the enemy's advance in the area between the Elbe and the Rhine in the hope of giving time for sufficient reinforcements to assemble behind to prevent the enemy from crossing the Rhine. The area concerned is roughly 200 miles long by 100–150 wide. Like Gaul, it is divided into three parts by the Rivers Weser and Ems, which flow from south to north across it, roughly parallel to one another. The eastern sector, between the Elbe and the Weser, is about 60 miles wide; that of the central sector, between the Weser and the Ems, from 40–80 miles wide; and the western sector, between the Ems and the Rhine, about the same.

It is now necessary to consider for a moment the part which rivers can usefully play in tactical defensive plans. By tracing an irregular line across the countryside and on the map, a river is very apt to produce what may be termed linear tactical thinking. Troops are apt to take up defensive positions along the banks and to murmur "*Ils ne passeront pas.*" Nothing, of course, could be more fatal. Under modern conditions no river can ever be a serious obstacle to an attacker who is really determined to cross it. Even the Russians in the last war, with no bridging equipment but what they could improvise by felling the trees growing on the bank, had little or no difficulty in forcing the passage of very large rivers like the Dneiper, compared to which the Weser and Ems are mere trickles. A river can never form a tactical barrier, it can only be a hindrance and should be exploited in that spirit. On reaching its banks, the attacker is bound to pause before he can put any strong forces across, and this is likely to remain true even if we reach the stage, as we probably shall, when tanks can be catapulted across rivers by rockets. The apparatus for such an operation is bound to be complicated and take some time to assemble. Likewise, until the crossings have been very greatly developed, they are bound to constitute a defile, and it is when an army issues from a defile that it is bound to be to some extent off balance and therefore vulnerable to surprise attack, while the fact that any reinforcements to redress any reverses which may have been initially sustained have to pass through the defile to get to the battle field is a further disadvantage. These are the sort of opportunities which a well-organised mobile defence can exploit, always, of course, in conjunction with the air, for which river crossings afford admirable targets.

Except in so far as they may be created at the river crossings in the manner just described, the whole area is very devoid of defiles. It is worth while to consider for a moment the main lines of communication which cross it from east to west. First of all, there is the famous autobahn running from Berlin to the Ruhr, such a sitting air target that it is likely to be a death trap to both sides by day. Secondly, there are four main lines of railway:

(a) Stettin-Bremen
(b) Berlin–Hanover–Osnabruck
(c) Berlin–Magdeburg–Osnabruck
(d) Leipzig–Hanover

The whole area is, of course, very well supplied with roads in addition to the autobahn.

This pattern of communications clearly reveals one important bottleneck: Berlin. That may involve an important politico-military decision—shall it or shall it not be atom bombed?

With this outline picture in mind, it seems reasonable to assume that only very light forces would be left in contact with the enemy east of the Weser, and that their task as they fell back on that river would be to find out as much as possible about the enemy's dispositions and tactics. Meanwhile, strong bastions would be established, probably at Hanover and Bremen, to canalise the enemy's advance into areas where mobile armoured forces could hit him as hard as possible where it hurt him most, probably while he was thrown to some extent off balance by the crossing of the Weser. If, in the course of carrying out this plan, he could be induced to concentrate a large force, the air would be ready to take advantage of such a favourable target, though there again would we or would we not use the

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Troops of the 16th Airborne Division, Territorial Army, "jumping" during a big exercise

atom bomb in Western Germany, assuming that it was on our side? It would not be an easy decision to make.

If the hostile advance was continued across the central sector between the Weser and the Ems, and the defence adopted a similar policy to that already described, the outline plan would bear a marked resemblance to that devised by the present C.I.G.S. for Exercise Holdfast in 1952, his swan song as Commander of the Northern Group. But the parallel must not be stressed too closely. Things were made much easier for the defence in the Exercise than they would have been in actual warfare; the sector for which they were responsible was much narrower than it would be in the real thing. Moreover, the country round Paderborn, where the battle was fought, is more favourable for defensive purposes than that further north. Between the Weser and Paderborn the ground is much broken, leading up to the Eggeggeberger ridge, so well known today to the British Army, which forms an additional hindrance to an attacker and, with its densely wooded slopes, lends itself to intelligent mobile defence.

When we come to the western sector between the Weser and the Rhine, it is reasonable to suppose that the great industrial area of the Ruhr would act as a magnet to the attacking forces and they would certainly wish to capture it in as undamaged a condition as possible, since they would hope to make use of it. Atomic bombs might be dropped on its western approaches, but surely not on the area itself. Equally, no doubt, the defence would make it into a strong bastion. Between the Ruhr and the North Sea the nature of the country changes. There can be no doubt that Holland is an extremely difficult country in which to fight; movement is mainly confined to the roads, there are very few tactical features, and mobile defence in such country would perhaps be most likely to take the form of constant little irritating pin-pricks at the enemy, cumulatively upsetting his balance and morale, rather than strong, hard punches which would be difficult to organise in such country.

We assumed in the earlier part of this chapter that neither side would possess complete air superiority but that each would be able to establish local air superiority for special actions. While it seems probable that that would, in fact, be the true situation, it must be admitted that it contains in it an element of escapism. The importance of the air in all operations cannot be over-estimated. Should one side or the other succeed in achieving anything approaching the air superiority enjoyed by the Western Powers during the advance from Normandy to the conclusion of the war, there would be no hope of the other succeeding in its object, whatever that might be.

In conclusion, it is important to leave the subject with the following points in mind. (1) The developments in tactical weapons since the last war have been so great, and we know so little about them, that any view of future tactics can only be put forward with the utmost diffidence. (2) That whatever the effects of these weapons may be, the human element, with its liability to rise to great heights or fall to very low depths and its general fallibility, will always remain the same. Likewise, changes in weapons and tactics do not affect the fundamental principles of war. Only by basing our speculations on these principles and on our knowledge of human nature can we hope to reach any worth-while conclusions on the probable tactics of the future.

From this it follows that if we seek guidance from the campaigns of the past, we must confine our researches to the study of how they illustrate fundamental principles: the reactions of human nature to the stress of war, and the mental processes of great commanders. We shall go hopelessly astray if we imagine that the tactics of the past will suffice for the future.

E. H. WYNDHAM.

CHAPTER X

HISTORY FOR OFFICERS OF THE FIGHTING FORCES

By Captain Cyril Falls

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History is not in the main utilitarian. Except for those who make the teaching or writing of history their profession, it does not provide a livelihood. It may not make those who study it more successful in earning a livelihood than they would have been without it or than others of equal ability who start without it. Its primary characteristic is culture in which there is, or should be, an element of pleasure. It is a "liberal art." Yet, since it is a fertiliser of the mind, it may render its devotees better fitted for the battle of life, whatever their profession may be.

I am inclined to believe that history approaches most closely to the utilitarian and the practical for those engaged in some form of public service, such as the politician, the civil servant, and the more serious type of journalist. With these I would class today the military officer. Today he is often called upon to be an official, and sometimes to be a diplomat—and for a diplomat history is surely the best of all academic training. I find "Failure of a Mission," the memoirs of Sir Nevile Henderson, the British Ambassador to Germany at the outbreak of war in 1939, one of the most pathetic of books. The writer was well-intentioned and by no means without experience of diplomacy. But he had no knowledge of Germany and seems to have been without any historical background such as would have helped him to read the signs and prevented him from going astray.

In "The Use of History," A. L. Rowse writes: "Man is a social construct: he is what race and country, region and family, church and school and friends make him. As such, he is susceptible of analysis and even a fair amount of prediction as to his general course, though its particular lines may be fluid and flexible within the pattern. . . . There is some system in history and it is at its highest when you are observing the movements of masses. . . . The 'laws' of history, then, are of the nature of statistical generalisations: in dealing with one individual little calculation is possible; in dealing with a great number one may even draw graphs."

Mr. Rowse also remarks that what has most impressed him about his colleagues who are historians is their accuracy of mind, accuracy to fact and circumstance. He admits that lawyers have a greater verbal exactitude and that philosophers, logicians, and even mathematicians combine subtlety with precision to a greater extent. But, he says: "They do not speak the language of common humanity. The study of history gives you a common-sense accuracy, rather than a subtle precision."

If, then, the study of history is not utilitarian in the direct sense, it may be so indirectly, and I consider that officers of the fighting forces are as likely to profit by it as any members of the community. When they take it up, however, they are apt to be disappointed to find the work of many modern historians unrewarding. Among these there has been a tendency, which I am glad to think is now disappearing, to treat war as a subject of little interest. People who start in that frame of mind may be expected to fail in such dealings as they feel themselves compelled to have with the subject. When they come to the wars of their periods, they either dismiss them with a few words or, through sheer ignorance of the very elements of principles and weapons and through inability to discover obvious probabilities when facts are obscure, make an extraordinary muddle of them. Some celebrated and otherwise highly competent historians make a travesty of the military operations which they seek to describe. There have always been exceptions, and now I believe matters are on the mend in this respect. It was an absurdity that many historians who dealt with the diplomatic affairs of their periods expertly either treated the military affairs inaccurately or virtually did not examine them at all, as if the professional military historian's field were too abstruse for anyone else to enter, or even as if it were contemptible. This was not the type of history likely to attract the officer.

So far I have been writing of history in general. General history, uniting the political and diplomatic, the economic and commercial, the social, the legal, the literary, and the artistic, is the most valuable kind. It is, however, comparatively rare in modern times. More than ever nowadays historical writing is divided into sections. It tends, in my view, to become too specialised, too much written by specialists for specialists. Among these special forms of history is one not mentioned in the list above which is likely to provide a large proportion of the reading of officers: military history. In dealing with it I shall begin on a moderate, modest, and cautious note.

Military historians sometimes claim too much for the study of their type of history. When they do so they damage their own cause. If students are led to believe that the study of military history is going to provide them with solutions or formulæ for use in war, they will find themselves quickly disillusioned. They will find that it does no such thing. Then they may make up their minds that military history is of no value to them and neglect it. That is a pity, because military history may indeed be of great value to them, if not in the way they expected.

All the great students of the history of war have denied that it can provide anything like a code of rules. Marshal Foch opened the first of his famous lectures by saying that the reality of a future battle was something which one did not study. On the battlefield one did what one *could* to apply what one *knew*. If there was not a science of war, there was a theory founded upon history, and it could be taught. Learning harmony would not make a composer, but a serious musical composition could not be created without knowledge of harmony. To make a mistake on this point may be not only disappointing to the student, but even dangerous. He will be inclined to look for text-book solutions without recognising the difference between his problems and those of the text-books. History does not exactly repeat itself in war any more than in politics or sociology or economics. Yet broad features and principles constantly appear in strategy and even, though to a lesser extent, in tactics. Knowledge of them and ability to recognise them when they appear slightly disguised will show that military history can after all be of a certain practical value.

Let us for the moment leave aside the study of campaigns and battles and look at a feature of historical writing which, it seems to me, everyone will admit to possess some utilitarian value, anyhow for the more senior officers. I mean the annals of how wars arise, the various kinds of stress which have produced them in the past. Then, too, this form of study will take in the typical military policies of various nations—and when we come to look at these we are tempted to say that history may after all repeat itself exactly. At first sight the similarity between Russian policy under tsar and commissar, German under emperor and fuehrer, are astounding, but when we come to examine them we find them natural enough.

The Russians possess most of the minerals and agricultural resources required for a major war. Their country is largely self-supporting. It covers an enormous area and supports a large population. On the other hand, it has difficulty in producing suitable officers, at least at the start of a war—under the tsars because the classes which might have been expected to produce the best were inclined to be frivolous and not to pay enough attention to their trade; under the commissars because the classes now drawn on are often not well enough educated. The European frontier has no natural defensive strength. Thus we find patience one of the primary Russian characteristics in war. Communications have never been up to the contemporary European standard, which is a handicap to the offensive but may be in some respects an advantage to the defensive. Thus we find Russia prepared if necessary to sell ground for time, but preferring if possible to start with a foothold in countries to the west, particularly those inhabited by fellow-Slavs. We do not find her keen on distant expeditions. Even the great Suvarov, who, with an Austrian ally and after Nelson had cleared the Mediterranean, carried out a highly successful campaign in Italy, crashed in Switzerland. The importance of the Baltic and Black Sea, the yearning for control of the Dardanelles, are constant factors whatever the form of government.

Germany is less well equipped for a long war and so cannot afford the Russian patience. She has foes or potential foes on both flanks. For example, Bismarck brought hostilities with Austria in 1866 as speedily as possible to an end because he was nervous about the attitude of the France of Napoleon III and even somewhat concerned about that of Russia. Germany's internal communications have for at least the last century and a half been up to the best European standard. For the same period or even longer she has had at her disposal an aristocratic military caste very different from that of Russian tsardom: comparatively poor, industrious, with high professional ability, making good staff officers both for operations and administration. Thus she has been able to mobilise quickly and in a race to prepare has made ready sooner than her foes. For her a short war is a necessity and has always been the aim. She brought it off in 1866 and 1870, and was overwhelmingly victorious; she failed to do so in 1914 and 1939, and was utterly defeated. Her decision to become a great naval power, taken some fifteen years before the First World War, complicated matters and may indeed have been an error; but she cannot be said to have failed to produce a fine fleet, fine ships and guns, and fine seamen.

These are two instances only, though extremely important. The policy and action of almost every nation which needs to be considered from the military point of view can be the object of fruitful study. Perhaps none is more interesting than the case of our own country and, in more recent years, the Commonwealth. Almost the whole literary output of the late Admiral Sir Herbert Richmond is concerned with this subject. It involves both physical and political geography, race, religion, politics, economics, forms of government, sociology, and traditions. On the face of it there would appear to be no form of reading, apart from the purely technical matter which must come first, more likely to make of the officer "a full man," as Bacon thought reading did.

Study of this kind has recently taken a prominent place in the United States—and whatever other criticism can fairly be directed against its educational authorities, it cannot be said that their heads are in the clouds or that they are unrealistic. Up to the Second World War their interest was mainly confined to the War of Independence and the Civil War, though the influence of Mahan had created a certain interest in naval warfare in general. Not historians only but most thinking Americans are now acutely conscious of the new responsibilities and the new interests and links with other continents, especially Europe, which have been created as a result of that war. At the same time, they feel that they are moving in scarcely plumbed depths. They have little experience of dealing at close range with the peoples with whom they have suddenly been brought into the closest contact. Only a handful of their experts are familiar with their history. Their authorities—I am going to deal with military authorities here—feel that, in face of the new commitments of the United States and the leadership of the free world into which she has unwillingly been forced, her representatives must study history in order to acquire greater familiarity.

Towards the end of 1952 I visited Maxwell Air Force Base, Montgomery, Alabama, and there I had a close view of how this idea is being translated into action. It was in the senior class of what is called the Air University, the students being mostly full colonels, aged between 38 and 40. The instruction was given in three phases. The first dealt with international stresses and was divided into two studies: first, the realm of international relations with its sources of power, and, secondly, the conditions governing the conflict in the world of today. From that mainly historical phase the students went on, first to air warfare (theory, weapons, equipment, etc.) and finally to the third phase, that of global strategy, which included concepts of war in a future of from five to 12 years ahead. A remarkably high proportion of the time was spent on history. Naturally, I heard only a few lectures given during the three or four days I was there, and incidentally gave one myself, but the syllabus appeared good.

Later on I visited the University of Princeton, and there I found an unexpected scheme in its opening phase. The reserve officer now plays a great part in the service life of the United States. He may enter the reserve when he goes to a university, but if so he will have to do a considerable number of periods of education from the point of view of his reserve military service as well as his normal university course. The officers responsible for this sort of education found themselves in difficulties and enlisted the aid of the University. A committee was formed, and, with its advice and guidance, one assistant professor was taken off other work in order to provide a syllabus of instruction. The principles on which it was drawn up were much the same as those of the Air University, but addressed to men of a different age and type.

The task was tackled in a typically American way. No historical textbook dealing with the whole subject of the causes and conduct of modern wars existed. A large number of books, some rare and some dear, were needed to cover it. So the assistant professor produced a book of his own, largely made up of extracts connected by threads of explanation and discussion. Some hundreds of copies were neatly mimieographed. The reading was combined with a course of lectures, given by some able men not only from the University but also from the Institute of Advanced Studies, also at Princeton. All three services joined in the scheme, which had been, so far as I recall, started by the Air Force. The view was that this might be regarded as a "pilot" scheme and that, if it were a success, it might be taken up in many other universities, though the teaching at Princeton is a long way ahead of the average standard. These two instances prove that at all events recent history is not held to be wasted as a part of American military education and training. Where academic training is concerned it marks a notable change in the attitude of teachers of history. I should call it an advance.

Only a small proportion even of readers of history realise that in the last three-quarters of a century historical thinking has been revolutionised and that the result has been to elevate the importance of historical reading and writing. We need not worry our heads as to whether the original creater of this revolution was Darwin or Marx, or whether others had a hand in it. The point is that the idea of evolution is to be found occupying a place in almost all major historical work since their time and in a good deal of it the most important place. If we look at older historians we may at first glance think that there is nothing different from the moderns in their thinking, and therefore their aims, however much difference there may be between their methods. Presently, however, we note that the old historians look on history as a series of phases, each generally ended by some catastrophic event, and having little or no connection with each other. The moderns, on the other hand, see a constant process of evolution.

Take one of the finest, perhaps the finest, of the historical works of the year 1953, "Elizabeth and her Parliaments, 1558–1581." Here we observe that the author, Professor Neale, is all the time looking both forward and back, observing the development of the institution with which he is dealing. In one most interesting respect he is looking forward: as he reveals, more clearly than any before him, the sharpness of the challenge of the Puritan party to the Crown, he is looking obliquely at the reign of Charles I. Then the seeds sown in the days of Elizabeth brought forth their fruit. A wise and popular queen was followed by two unwise and unpopular kings and the result was disaster, say the older historians. This is not an untruth, but it is far indeed from the whole truth. Professor Neale makes it clear—and will doubtless make it still clearer if, as we hope, he produces another volume to cover the end of Elizabeth's reign—that conflict between Parliament and the Crown was inevitable, even though it need not have led to such disastrous consequences.

Assuming, as I think we must assume, that the idea of evolution is in general valid and based on realities, it is surely clear that the work of the historian gains in importance and value. The older history might be admired and relished because it pictured former scenes and ways of life, which must always be of interest, because it showed us our ancestors. History which takes account of evolution does that also, but it does much more. It shows us ourselves in our ancestors. It reveals how their ideas, their institutions, their successes and mishaps have influenced us for good or ill.

Of course I am simplifying, as one does in argument. It would be untrue to say that none of the earlier historians had any notion of development and evolution; but it was at best relatively dim. To-day every one of the greater historians has the idea clearly fixed in his mind. And so the best modern history shows us still more than ourselves in our ancestors. It gives us a key—not of course one that will always unlock every door with which we are faced, because history is full of accidents, but a useful key—to future developments and events. It renders us familiar with the internal characteristics of other nations and with the relations between nations: their sympathies, their past conflicts—perhaps left undecided, like control of the Dardanelles, so that the possibility of renewal has to be taken into account—their methods, the sort of challenge which may be expected to induce them to resort to war, their genius for war in the past, and the influences which are likely to affect their strength for the waging of war at the present time and in the future. I cannot conceive any form of mental training likely to serve better the officer who hopes to rise in his profession and reach a position in which he may be concerned with world affairs.

It is hardly necessary to insist upon the importance of diplomatic history from this point of view. That will be apparent to every intelligent observer. One of the theses of Clausewitz known to many people who know no other is that war is an instrument of policy, a continuation of policy by other means, that is to say, a continuation of diplomacy; not a break with policy, as used to be supposed. The value of economic history is less clear at first sight, but easy to understand on reflection. One of the main causes of war has always been pressure of population on space and resources, and in particular its pressure on food supplies, in short, the risk of hunger. In many cases this factor will be found concealed among others which are given more prominence during the period of charge and counter-charge which commonly precedes a war. The history of Japan during a half century ending in 1945 is that of an overcrowded country, dangerously near to the minimum level of subsistence but with a steadily growing population, ever seeking new outlets for its surplus population, to which a large proportion of the world was barred. In Manchuria, where Japan found it impossible to plant a colony of her own people on the scale which she had perhaps at first intended, because only a small proportion could be induced to face the climate, she adopted another policy. Only a few hundred thousands of Japanese settlers moved in, as against millions of Chinese farmers. But the Japanese were in control and Japanese capital was not lacking. Manchuria became a great field of exploitation. Its agricultural products helped to feed Japan; its minerals contributed to her industry and thus to her rapidly increasing exports, which paid for goods which she either could not produce herself or of which she was short.

This is only a single modern instance of the significance of the economic factor in war, but a very important one because it played a big part in drawing Japan step by step into war with the United States and the United Kingdom. In earlier times we find the struggle for maritime trade and fisheries a cause of war. The determination of nations to exclude others from trade with their colonies, as Spain determined to exclude England in the sixteenth century, tended to lead to war. Our own interpretation of the right to search at sea and of what constituted contraband of war had a similar effect. Fisheries might be even more important than they are today—and we have recently seen the subject cause serious disputes—in days when the deficiencies of agriculture made it necessary to slaughter a large proportion of the livestock about Christmas time for lack of fodder to keep it through the winter.

In the reign of Queen Elizabeth I this country made a great effort over a long period in aid of the Dutch States General in the struggle with Spain. Within less than a half-century of her death England was at war with Holland—and it was a revolutionary England which went to war with a revolutionary Holland that had abolished the Stadtholdership and might therefore have been expected to appeal to Cromwellian sympathies. The cause of trade predominated over that of politics. The Dutch wanted the best of both worlds. In Europe they demanded full freedom of the seas, and, dependent as they were on their carrying trade, demanded that their neutral flag should cover even the goods of England's enemies. In Asia they were complete monopolists, and we had never had to reproach Spain at her most ferocious with an outrage worse than their massacre of English sailors at Amboyna in 1624. And it was not one war only. War followed war after the Restoration. Seldom have naval wars been harder fought.

I have been writing about the causes and background of war, and I do not consider there is much difficulty in proving that the study of them is likely to be of interest and use to officers of the fighting forces. Some of those who do not dispute that may not agree that study of the conduct of war, its detailed strategy and tactics, may also merit attention. I have already suggested that both may possess material utility, but strategy more than tactics. I am now going to consider them from the general point of view of the student of history.

If wars always led to inevitable results the importance of their conduct would clearly be much diminished. There is a school of determinists which holds that this is the case. Some of its members combine contempt for military history with a remarkable tendency to misunderstand it. This school, however, does not appear to be powerful enough to stem the advance which has taken place in recent years in the prestige of military history and the recognition accorded to it in general history.

When we come to study war with attention we find that the results of war and even of individual battles are far from being inevitable. In some cases they have caused universal astonishment. At the same time we find that some of these wars and battles have had deep and long-enduring effects upon nations, sometimes upon mankind. And, thirdly, we can occasionally find a case where a misunderstanding of the course of a war, due to lack of care or ignorance of historical material, has led to a misapprehension of general history.

As an illustration of the two first points take the Polish war with Bolshevist Russia in 1920. What have the determinists got to say about this and which side would they have, before the event, taken to be the predestined victor? From the moment when the Russians first defeated the Poles on the Beresina on July 4 all went well for them. They gained victory after victory. The Poles never succeeded in standing anywhere. They did not even succeed in checking the Russian advance, the leading wing of which covered some 400 miles between the first blow and August 12. The Poles hardly fought. They were discouraged, and even more bewildered than discouraged. When the Russians closed in on Warsaw not one outside observer in a hundred would have foretold its salvation. Indeed, the Polish Government had as early as July 22 asked for an armistice, which might have been reached had not the Russians believed they could get more by pressing on. That was the situation when Pilsudski launched his slender counter-offensive from the Wieprz, south-east of Warsaw.

A few days later the Russians were flying in rout, abandoning almost all they had brought with them. One army and parts of another were driven over the neutral frontier of East Prussia and interned by the Germans. I need hardly insist that this was a wholly unexpected result. For its effect on Europe I will call as witness the defeated commander-in-chief. Speaking to the Military Academy in Moscow, Tukachevsky said:

"There can be no doubt that, if we had been able to tear away from the Polish bourgeoisie its army of the nobility and middle classes, the revolution of the working classes in Poland would have become a reality. And this conflagration would not have stopped at the Polish frontier. Like a wild mountain torrent it would have swept over western Europe. The Red Army will never forget this principle of revolution created from without."

It never has. To my mind the historian, indeed the reader of history, who meets such astounding events and is not moved by curiosity, at the lowest, to investigate them and learn why and how they happened must possess a phlegmatic and unenterprising mind.

To illustrate the third point, that of misunderstanding of a war causing misunderstanding of general history, I will turn again to the Elizabethan age, which happens to have been the period of study in which I have recently been engaged. The historian Seeley wrote of the reign of Queen Elizabeth I after the defeat of the Spanish Armada in 1588:

"It is a peculiar and unique period of English history, in which war is waged, but freely, with a triumphant sense of power, with scarcely any sense of danger. . . . The glory of 1588 tinged every succeeding year of the war; the sense of danger and the tension that had held the national mind for a whole generation was gone, and a new generation grew up to revel in victory and discovery."

That seemed a correct interpretation to most readers and would perhaps be widely accepted even now in popular circles. It was false, and the reason for its falsity was inadequate study of naval history. Now read what a first-class modern historian, not a military historian but a general historian covering the whole span of the history of England, Keith Feiling, has to say on the subject:

"Nothing was more disappointing than the naval war. In part this was due to rival policies, but even more to a great increase in Spanish efficiency. . . . Strong galleons of the 'Indian Guard' and swift treasure-carrying cruisers, excellent fortifications in the Islands, convoy from St. Helena for the carracks coming from India—against these Drakes' method of surprise had lost its power."

It would not be correct to deduce from these words that Spanish reform started only after Armada year. The reforms had developed gradually and were now hastened. Nor is it the case that the best Spanish galleons reached the standard of their English counterparts, though in frigates and fast light craft the Spanish builders at least caught up. We think of warships of that time as high-built floating castles and of the Spanish as taller, broader in beam, and clumsier than our own. This was true of the great ships and galleons of the Armada. Yet it was a Spanish designer, Pero Menendez de Avilés, who had fifteen years before introduced the fast light galleon, long in proportion to beam, low-lying, and flush-decked, which was used in the "Flota" or Plate fleet as a treasure-carrier. Seeley does not tell us that our trade was harried in our own waters by fast *felipotes* from Blavet, for a short time by galleys from Sluys, and right to the end by ferocious Flemish privateers from Spanish-held Dunkirk. And he does not tell us, and doubtless did not know, that, though our main objective was Spanish treasure, the flow of bullion to Spain reached its maximum between the years 1590 and 1600. I do not suppose that we ever stood in the gravest danger, but we faced a danger which the sailors took seriously enough, whereas they had been pretty confident in Armada year.

If we fail to gain a clear picture here we find ourselves unable to grasp the full significance of the astonishing drama of the last years of the Queen's reign, the conflict between the peace and war parties and especially between Sir Robert Cecil and the Earl of Essex. We shall put it down wholly to the latter's ambition. That element was present, but it is unfair to Essex and a misconception of the nature of the conflict to stop at it. Essex saw that the struggle was in essence a struggle for power in the New World. He saw that the raiding policy on which England fell back after her last great victory at Cadiz in 1596 was indecisive. He thought that the Cecils were prolonging the war by a policy of half measures. He wanted a decisive issue, which he thought could be obtained only by the destruction of Spanish naval power and maritime trade. Instead of seeking the convoys at their western starting places, particularly Havana, or even at their ocean rendezvous and refuge at Terceira in the Azores, he advocated the seizure of a base on the Spanish coast itself. There the English fleet could not only challenge the Spanish and force it to decisive action, not only make it impossible for the Flota to bring home its American goods and bullion, but also cut off the riches of the East Indies arriving in the carracks and the valuable Baltic trade—which included masts and spars—carried by the "Easterlings," fine seamen who did not hesitate to take their fleets north about, round Scotland and Ireland, if they were likely to be intercepted by the English in the Channel. Whether or not it would have been practicable to hold a port such as Cadiz permanently against the whole military might of Spain is immaterial from our point of view. This was the policy of Essex and his war party.

The point is that the quarrel started over the conduct of the war. If we are to grasp the full significance of the quarrel we need a clear picture of the war as it was being conducted. The conflict between Essex and Robert Cecil, which ended in the revolt and execution of the former, represents an absorbing phase of Elizabethan history, even of English history. Much of its background is to be found in the war itself. Surely it is desirable to study the details and technicalities of the war, not only to "get things right" but to correct false versions of political events and gain a clear perspective of the whole period.

Surely study on lines of this sort cannot fail to be of advantage to the officer of the fighting forces. It is easy to pick holes in Julian Corbett as historian because he was sometimes careless, often prejudiced, and inclined to inconsistency in his arguments; but we owe him a deep debt because in "The Successors of Drake" he gave us new interpretations which will stand the test of time, though their details may require correction.

My examples and illustration have for the most part been taken from fairly old wars. I cannot admit that they are without value to the professional military student. It is, however, reasonable to say that, where he is looking for practical aid, he is likely to be most successful in surveying modern wars. Foch made a distinction between dynastic and national wars, and thought the latter so much the more profitable to the professional that he confined himself entirely to them; in fact, the main subject of his lectures was the Franco-German War, the last great war and only a quarter of a century distant when he first went to teach at the Ecole de Guerre. His outlook was thus very different to that of Mahan, which I prefer; but that of Foch has some points in its favour. Perhaps it is more suitable to land than to sea warfare because national wars, fought by the bulk of the young males of nations engaged in them, have influenced war by land more than war at sea. I should recommend modern warfare to the serving officer who desires to make a start but finds his time and facilities limited.

I also consider, though not everyone will agree with me, that it is better to read deeply than widely. The complete understanding of a war, starting with its political origins, the influence of economics upon it, and its strategy, will provide a good starting-point for further study. But what I have already written will make it clear that I do not recommend stopping there. We should go on to weapons, equipment, and tactics. They play the greatest part in military decisions. The tendency of historians, even military historians, is to overweight strategy at the expense of tactics. Strategic error may be remedied by tactical success, whereas a serious tactical defeat may be fatal and at best probably involves starting all over again. In certain important wars—the Austro-Prussian War of 1866 and the Franco-German War of 1870 furnish good examples—the strategy can be thoroughly understood in an hour and had astonishingly little effect upon the result. Weapons, tactics, and training were what counted. The most interesting strategic studies for a Briton are those of combined operations, but a very inadequate notion of them will be acquired if the student does not carry on his examination to include tactics. After all, wars are won by fighting, though there are always plenty of people trying to persuade us that they are won by anything but that. So I do not recommend to officers a study of war which stops short of tactics.

If I have been too diffuse I will try to make amends. I will try to give an answer as concrete as possible to the plain question: "How far is strictly professional military history likely to help the professional officer of an armed force?" Well, to begin with, every form of theory and every form of training used by armed forces are in a sense bottled history, though often only very recently bottled. The formations in which sea, land, and air forces move, manœuvre, and fight are determined by experience, which is generally recent history and occasionally turns out to be surprisingly ancient. Suppose that a soldier awakened after a sleep of a thousand years had the nature of modern warfare explained to him, and was then appointed to command an army in the field. He would be a genius indeed if he decided that platoons of infantry should march long distances apart, that they should keep to the side of the road, and that the men should fix small branches or tufts of grass to the tops of their helmets—and this is one of the simplest practices. He would be ignorant of the recent historical experience which brought such methods into vogue. On the other hand, night marches might be familiar to him because they formed part of the historical experience current during his former period of activity as a commander.

History and theory, which are often much the same thing, teach us to save time by adopting procedures which have been proved to be sound. We ought not to be their slaves. A great genius, a Napoleon or a Nelson, strikes out a new line. He adds to the sum of experience and in so doing may transform the art of war. He "makes history." Yet even he does not start with a virgin page. The first of these men was a deep historical student in whose campaigns the influence of his reading can be traced. The second had assuredly absorbed the historical experience of Hood and St. Vincent. Watching St. Vincent, a civilian, Lord Spencer, First Lord of the Admiralty, learnt so much of naval affairs that in St. Vincent's opinion his judgment was better than that of the Sea Lords. I cannot put my views more plainly.

In a wider sense, though, as I said at first, history does not provide precise solutions to military problems, strategy in history is subject to similar influences throughout and in a number of cases retains a strong likeness through the ages; tactics change more often and more radically, but even here similarities are to be found. I do not pretend that historical study is indispensable to the officer. I have not argued, as some people do, that the history of war must be part of the professional outfit. I should be sorry to let it be thought that serving officers ought to be bookworms. Yet I believe that time spent on military history is not likely to be wasted.

Some beginners seem to be doubtful about their method of approach to the subject, but there is not much difficulty about it where a good library is available. These generally contain some useful bibliographies. Where they cannot be found, articles in encyclopedias, while in many cases too compressed to serve in themselves, generally contain lists of authorities compiled by writers who know their subjects well. In the same way the book lists of serious modern authors point to older authorities still worth consulting. Original authorities are of great value. "Original" need not scare the beginner; it does not necessarily stand for "unprinted" or "unpublished." Largely owing to the Navy Records Society, British naval history is rich in original material—despatches, correspondence, orders, instructions, and the like—which are printed, published, and readily available. It is certainly more difficult to reconstruct events from this material than from a narrative compiled by a historian, but historians have their prejudices. Both can be consulted together and one checked by the other. The Navy is probably richer in original material of this type than the Army. It is also a time-saving device to keep handy a good general history. It will often make puzzling features and passages clear. Books concerned with the weighing of historical evidence exist, but it will probably be found that this power comes by practice, except when dealing with very old times in which conventions and methods of expression are unfamiliar to the reader.

For those who have not the time or means or inclination to go so deep, the most modern historian, provided there is reason to consider him sound, may be the best. He must have the reputation of soundness because even in this field writers will be met who turn out gaudy works which have a quick sale for a few months but are then forgotten. The advantages of modernity are that almost always some material is available to the modern which his predecessors did not possess and that, on the whole, the modern's critical use of his material is the better. Those who have read the late Douglas Southall Freeman's "R. E. Lee" and "Lee's Lieutenants" can if they so desire dispense with all the large body of literature about Lee and most of that about the lieutenants.

Visits to battlefields often throw new light upon the wars or battles to which they belong. I try not to miss a battlefield if I am anywhere near it. Once, passing through a little Norman town, I glanced sleepily at the road map and was instantly wide awake when I found I was in Tinchebray. I begged the friend who was driving to pull up, jumped out, and asked a couple of the more intelligent-looking citizens if they knew the site of the battle. They had never heard of the battle. This was hardly surprising, since it was fought in 1106 and resulted in the crushing of the Norman baronage by Henry I of England. Then, far down the hot street, two portly forms in cassocks and broad shovel hats advanced slowly down the middle of the road. I persuaded my friend to wait, though we were in a great hurry. The elder priest did not hesitate. The site, he said, was well known.

"C'était là, monsieur, derrière la boucherie. Le Roi Henri——"

CYRIL FALLS

CHAPTER XI

TOTAL WAR

By J. M. SPAIGHT

WHAT TOTAL WAR IS

WHAT IT is that makes a war total is not always clearly understood, or perhaps one should say that those who have dealt with the question have been inclined sometimes to fasten upon different characteristics of it and to give them varying values. One finds, for instance, a writer in an American Service journal dwelling on the destruction which it involves and attributing the first demonstration of it in modern times to the devastations which Sherman and Sheridan carried out in Georgia and Virginia in the War of Secession.* Other American writers would give it a more modern origin. One of them states that total war—"a conception new in modern times"—emerged in 1914. "Not until the first world war was a whole group of States transformed into military engines, with no aim but the aims of warfare, and with the power to commandeer the lives and labours of their citizens."† Another would make the date later still. In the second world war, he says, the United States introduced "a new art of war in which logistics usurped many of the functions of the other branches—the thing the Nazis referred to as 'total war' but never quite understood or found the means to put into practice."‡ On the other hand, the view of a British military historian is that the war of 1939–45 was only a further chapter of a story which began a century and a half ago. "On the political side," he says, "the war witnessed a further advance towards 'totality,' a process which may be said to have begun in the Napoleonic Wars."§

Whatever be the date of the birth of total war, it is true to say that in its modern form one of its distinguishing features is the more or less wholesale destruction which it involves, while another is that the field of logistics is a wider one in total than in the traditional or limited war. But neither of these characteristics is the primary and determining one. What makes a war total in the first instance is the all-absorbing nature of the national effort which it involves. The employment in it of weapons of a kind which might not be brought into use in lesser wars is a secondary feature of total war.

Total war is defined in the Oxford Concise Dictionary as "war in which all available weapons and resources are employed." It is war in which a nation engaged in it gets really down to the business of making war, takes its coat off and rolls up its sleeves, puts the competing demands of peace-time aside, thinks of nothing but the one grim task of waging war, and pulls no punches in the fighting. Making war becomes virtually the nation's purpose in life. All hands to the pump is the order of the day, the pump that will save the ship of State from sinking. Everyone—practically everyone—is "in it." To hold back at such an hour would be unthinkable. Total war, for all its horrors, has at least the merit of closing a nation's ranks and putting an end to sectional and class strife.*

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* Colonel J. T. Fitzwater, "Air Force and the Totality of War" in the *Air University Quarterly Review*, Fall, 1952, p. 46.

† Stanton A. Coblentz, *From Arrow to Atom Bomb*, 1953, p. 393.

‡ Fletcher Pratt, *War for the World*, 1951, p. 348.

§ Cyril Falls, *A Hundred Years of War*, 1953, p. 350.

THE OLD-STYLE WAR

How different was the old, rather leisurely war which we used to know, war that ambled along at a jog-trot and at top speed could still keep time to "the cavalry canter of Bonny Dundee!" Of course, the old war affected our lives and businesses, too, but usually it was for us in Britain something that took place far away and involved no very sharp change in the routine of our daily existence. "Fifty thousand horse and foot going to Table Bay": we were pleasurably excited about that, felt glowingly proud and patriotic, cheered and waved flags, but when the troopships had left we returned to our ordinary work and accustomed tasks. The war never really came home to us, to most of us at any rate. It never became the engrossing pre-occupation, the disturbance, the upheaval which total war may mean for a whole community today.

THE NEW ORDER

Total war is a new phenomenon, whatever its pedigree. It is a by-product, on the one hand, of mechanisation, on the other, of national service. Mechanisation, which might have been expected to have the effect of making armies smaller, has been accompanied, on the contrary, by a pronounced increase in the size of them. (Compare the numbers of troops engaged in, first, Napoleon's campaigns, and, secondly, the Kaiser Wilhelm and Hitler wars.) Machines have become increasingly important in modern war. They are needed in enormous numbers, the machines that go to war, the machines that make those machines, the machines that make the machine-making machines. A huge host of artificers is needed for the fashioning of them, a host even greater than that which goes into the field. Later in this paper it will be shown how substantially the civilian work-people engaged, broadly, on armament work exceed the number actually bearing arms.

Not only the makers, processors and assemblers of the war-serving machines but the workers in a great number of other industries are in the war which is waged on the home front. Steel, aluminium, copper, lead, zinc, chrome, manganese are needed in large quantities in the manufacture of armaments and their accessories. So are the synthetics—rubber, oil, nitrogen, parachute silk—as well as the components and instruments, the ball-bearings, the electrical equipment, the radar parts, the fuses, detonators and sights, the delicate devices of a hundred kinds of which the new scientific war makes use. Of primary importance among the regiment of war-workers will be in future those producing and processing atomic and hydrogen weapons and the materials for them, uranium, plutonium, deuterium and tritium. The world has moved on a long way from the

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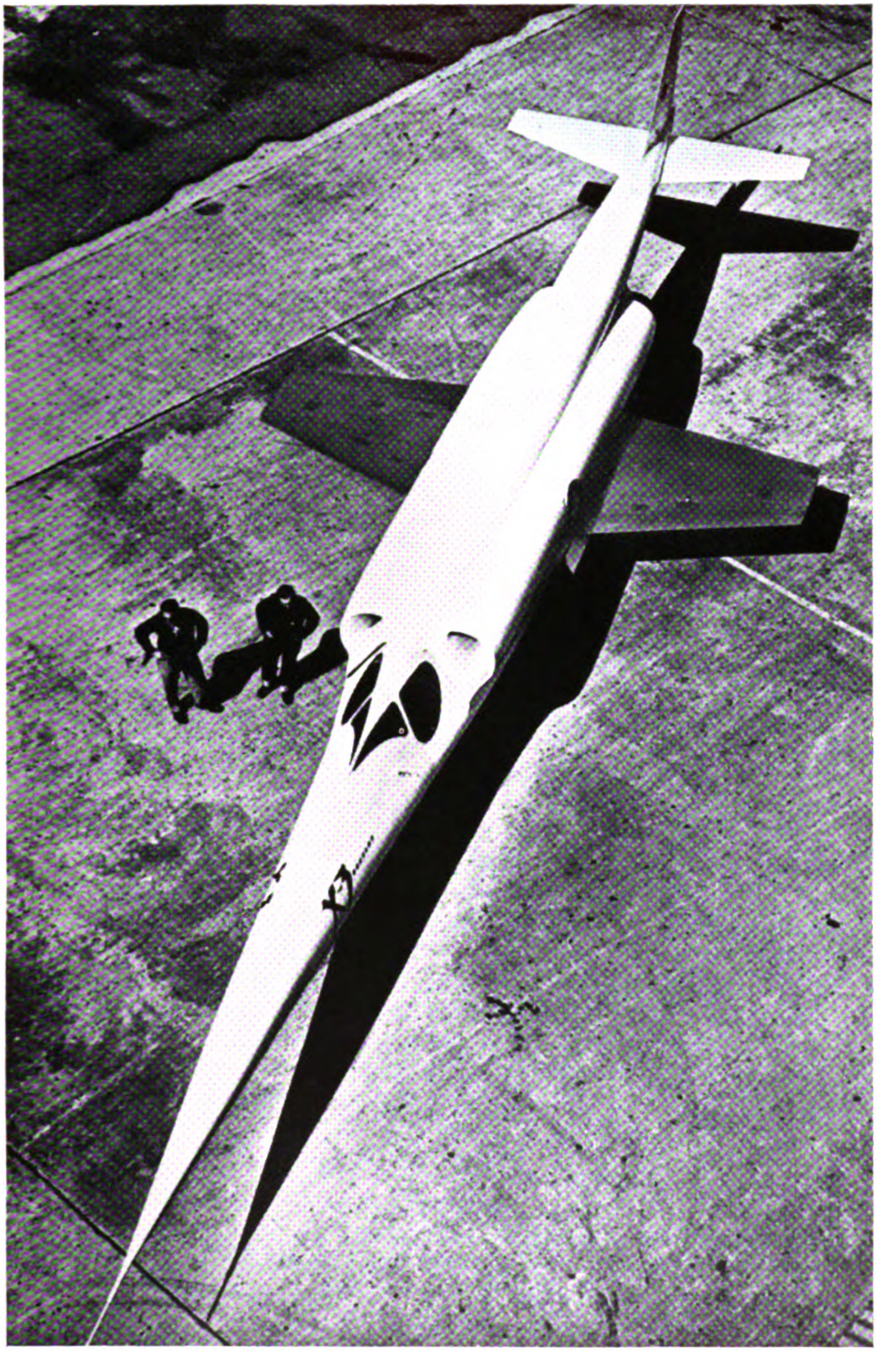
* The improvement in this respect is largely due to the fact that there is frequently in war a sense of mission, a feeling that the fight is one against a monstrous evil, that the nation's cause is clearly righteous. In this respect, as Professor P. A. Reynolds points out, modern wars are comparable to the religious wars of the past. (*War in the Twentieth Century*, 1951, pp. 25–26.) That does not mean of course that those old wars were "total."



Douglas X-3, two Westinghouse J-40 turbojets

days when the flint-knappers were the only armourers. A vast and complicated organisation embracing and controlling a great part of a nation's economy is the essential background of its participation in large-scale hostilities today.

THE NATION AT WAR

Fifty years ago we used to hear much of "the nation in arms." That was, indeed, the title of a book by a German general, Baron von der Goltz, published in the early years of the present century. The nation in arms meant for him the able-bodied male population trained for war, a conscript army of the Prussian type, an array of uniformed men ready to take their place in the line. He took little account of the economic mobilisation needed to keep such a force effective. After the first world war another German general wrote a book with a not very dissimilar title, and he, too, gave little weight to the industrial factor. He only shifted the emphasis from the man-power aspect to the politico-moral. In *The Nation at War* General Ludendorff's theme was the necessity for national solidarity under the stress of what he termed "totalitarian war." The term is not a satisfactory one; it suggests war waged by a country whose political regime is totalitarian, whereas total war may be waged by a free State, too, and waged even more effectively than by a despotic State. Mr. Joseph G. Grew, who was American Ambassador in Tokyo at the time, records some conversations which he had with Mr. Matsuoka, the Japanese Minister of Foreign Affairs, in 1939–40. "You in America could not fight a total war," the latter said. Only a totalitarian Power could do that. The Americans, with their daily comforts, their labour troubles, their pacifism and isolationism, would be incapable of the effort demanded.* Mr. Matsuoka was sadly mistaken. No country ever waged a war more wholeheartedly and successfully than the United States did in 1941–45.

"The totalitarian war," General Ludendorff wrote, "far from being the concern of the military forces alone, directly touches the life and soul of every single member of the belligerent nations." "Totalitarian war is directed not only against the fighting forces but indirectly against the nations themselves."† Measures designed to weaken the enemy nation's morale and will to resist were features of total war which the general had mainly in mind. Such measures can be resorted to in any kind of war. The basic characteristic of total war is the transformation which takes place in it from a peace to a war economy.

WOMEN IN TOTAL WAR

Perhaps the most striking feature of the change is to be seen in the enormous influx of women into the war industries as well as into the Services. It began in the first world war. The "Sister Susies" of that war were by no means all engaged in "sewing shirts for soldiers." They took on a multitude of jobs of a far more masculine type. It was said at the time that they proved the truth of the old tag of our school-days which ran "Common are to either sex artifex and opifex." But it was in the second war that the women joined up in their full strength. "The

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* J. G. Grew, *Turbulent Era*, Vol. II, p. 1490.

† General Ludendorff, *The Nation at War*, pp. 15–16.

Ministry of Labour," says Professor Postan, "succeeded in decanting into the Forces and into war industry the entire supply of the country's employable women."*

In the engineering and allied industries—industries normally almost a male preserve—the number of men employed in June, 1943, was 2,472,600 and that of women 1,537,600.† In Germany, too, use was made of female labour on a very great scale. The United States Strategic Bombing Survey found that of the total German labour force in May, 1944, including the armed forces and foreigners, 28,700,000 were males and 16,500,000 were females.‡ A total war might indeed be described not unfairly as one in which the women go in, as it were, off the deep end; they only paddle about in the shallows in the smaller wars. If the women staged a strike against war, as the Greek women did in the play of Aristophanes, total war would probably peter out. They know, however, that it is a question of sink or swim for all.

THE SWITCH OF EMPLOYMENT

There was a shift of workers of both sexes to employment that served directly or at a short remove the national war effort. The Survey which is referred to above divided war-time employment into two sectors—a war sector and a civilian sector. In May, 1939, 42 per cent of the non-agricultural labour force in Germany was employed in the war sector and 58 per cent in the civilian sector. In May, 1944, the percentages were 59 and 41 respectively; that is to say, the pre-war proportions were almost exactly reversed. The comparative figures are evidence of the extent of the switch from peace-time avocations to others which had some connection with the hostilities. Nevertheless, the percentages show no less clearly that the idea that in a total war the population engaged in work not relating to the war is a negligible proportion is not sustainable. It is to go too far to say, as Mr. James Burnham does, that "today the armament industry is virtually identical with industry as a whole" and that the "war economy is equivalent, simply, to the economy."§ Actually, in Germany, a little over eleven million people were in the civilian sector in 1944, as compared with a little over fourteen million in the war sector. There were, in addition, some eleven million engaged in agriculture. The number in the armed forces never exceeded nine and a half millions.||

Statistics are tedious, inhuman things. The man of action, the man who has to apply the lessons, whatever they are, which they teach, is apt to regard them as fussy and academic, and, any way, not his concern. The figures quoted above *are* his concern if he is a bombing airman. They can serve as a sign-post for him in the selection of his targets. The main purpose of strategic bombing is, or should be, to make it more difficult for the enemy to maintain his war effort. Figures which show in broad outline just where the blows can be landed with the greatest effect for this purpose are of practical utility. The war sector rather than the civilian

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* M. M. Postan, *British War Production*, 1952, p. 222.

† *Statistical Digest of the War*, H.M.S.O. and Longmans, 1951, p. 20.

‡ *The Effects of Strategic Bombing on the German War Economy*, p. 38.

§ James Burnham, *The Coming Defeat of Communism*, 1949, p. 65.

|| *The Effects of Strategic Bombing on the German War Economy*, p. 37.

sector is obviously the more profitable objective. Establishments producing consumer goods not of any warlike importance are a poor mark for the bomb-aimer. They are not as paying targets as those whose output is of military significance. It is a waste of expensive bombs to dump them on a factory in which nylon stockings are made, or vacuum-cleaners, or washing machines, or anything of that description. The lack of such commodities is hardly likely to affect the morale of the civilian population to a worthwhile extent. So, too, the destruction of suburban villas and retail shops is calculated, on all the evidence, to harden and not to impair a belligerent population's will-to-war. All this is more or less obvious, but that it is worth restating is evident from the fact that in the last war the industrial establishments bombed in Germany were for the most part "relatively unessential to the war effort."*

STRATEGIC AIR WARFARE

It is the coming of total war that has given strategic air power its justification and its golden opportunity. Only in total war does it come into its kingdom. It needs elbow room and freedom of action to be really effective. It cannot have them, usually, in limited, small-scale war. Total war is hardly conceivable unless powerful, heavily industrialised countries are engaged in it. In such war there will be no lack of strategic objectives of attack. In the smaller war there may be little or no belligerent industry to be made a target. One of or both the belligerents may have his or their sources of supply in countries that are not parties (in name at any rate) to the hostilities and whose industrial centres are therefore out of bounds for the opposing air force. That was the situation in Korea. The style of the American B-29 bombers, which had played havoc with the Japanese cities in 1945, was cramped as a result. There was, indeed, some criticism of the air action in Korea on the score of its apparent ineffectiveness. The Allies had complete control of the air over the fighting zone, but said one commentator, "in spite of their air superiority the land war seems to drag on in much the same manner as if none of the huge sums spent on the Allied air forces had ever been used. There is here a considerable risk that the old controversies about the value of air bombing, and indeed of air activity in general, will be revived."† The writer quoted pointed out that the situation referred to was in part due to the ban upon the bombing of the Communists' more distant strategic bases. In total war there would be unlikely to be a parallel situation.

Another reason why strategic air action is so much more important in total war is that such war, to a greater extent than limited war, is a contest of armourers no less than of armed forces. In it the scale of the operations and the expenditure of material of all kinds are vastly greater than in small wars. A tremendous effort of production and transportation, surpassing anything that is called for in a limited war, is necessary to keep the armed forces adequately supplied and equipped. The nation that can beat its opponent in that battle behind the lines is the nation that wins. "God," Mr. Hanson Baldwin has well said, "is today on the side of the big factories, not of the big battalions." A serious interruption of a belligerent's war production may be as bad for him as a lost battle.

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* United States Strategic Bombing Survey, *Over-all Report* (*European War*), p. 74.

† Article by "A Student of War" in the *Manchester Guardian*, March 10, 1953.

THE INTERRUPTION OF PRODUCTION

It is going too far to claim, as a French air officer does, that the air arm alone can attack war potential.* The other arms of war can take a hand in work of that kind on occasion. Japan's petrol refineries, for instance, were brought to a standstill when all sea-borne consignments of crude oil were cut off by the American Navy and its air arm in 1943–45. The Russian army's seizure of Ploesti in 1944 was a very damaging blow to Germany's oil potential. Nevertheless, it was air power which interfered most decisively with that potential. In spite of the loss of the Rumanian oil fields, Germany might have succeeded in making her liquid fuel suffice for her bare military needs if the British and American air forces had not pulverised her own refineries and synthetic plants in 1944–45. It was the great assault on her railways and oil resources that crippled her industry and rendered her incapable of continuing to wage total war. That was the conclusion of General George Marshall himself. "The effects," he wrote, "were enormous, for transportation and communications are the life arteries of a modern industrial State engaged in total war."† It is of interest to note that Rommel, when he was blue-printing the future Anglo-American-Soviet war which he was sure would come, foretold that the western Allies would win it by blasting the Baku oil region from bases to the south of it, for without oil, he said, Russia would be down and out.‡

The factories, it has been stated, are in the line of fire in total war. The fire comes from manned aircraft. It may not be always so. Long-distance missiles may be so developed that they will hit individual targets with precision. German troops, we know, were buoyed up by hopes of this kind in the last war. In 1944, a German fighter pilot has recorded, there were reports going around of the new *Wunderwaffen* that would allow English industrial centres to be hit and the war to be thus decided. It was even said that it would soon be possible to launch rockets in Germany and bombard New York.§ That forecast has still to be fulfilled, if it ever will be. For the present and for some time to come it is the air arm that will have to undertake the task of silencing the hammers of an enemy's war industry.

THE AIR ARM'S SHARE OF PRODUCTION

If one leaves out of account for the moment the immensely important contribution of sea power to the crippling of an enemy's war potential, one may describe the contest that is involved in total war as one between air power on the one side and industrial power on the other. That broad description might be misleading if it were not added that air power is itself a product of industrial power, so that, in striking at industrial power, it is striking incidentally at itself: which is a perfectly sound and logical proceeding, since the air power thus struck at is the enemy's. How large is the proportion of a belligerent's productive capacity that is devoted in war today to the creation and maintenance of air power is not commonly appreciated. The official statistics of the British war effort, published in 1951, are illuminating in this respect. They show that in June, 1943, of a total of 3,453,000 persons employed in the engineering and allied industries, 1,573,800 were working on orders for the Ministry of Aircraft Production, 1,299,000 on orders for the Ministry of Supply, and 580,500 on orders for the Admiralty.* The Air Ministry's claim on industrial resources, says Professor Postan, was given priority in the summer of 1940, and at the end of 1941 its total demands completely outweighed the burden of other priority demands.† The United States Strategic Bombing Survey estimated that 40 to 50 per cent of Britain's war production was devoted to the Air Force.‡

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* "L'aviation a l'exclusivité de l'attaque du potentiel de guerre."—Lieut.-Colonel Lainey in *Forces Aériennes Françaises*, August, 1950, p. 650.

† *Report on the Winning of the War in Europe*, 1945, p. 31.

‡ *The Rommel Papers*, 1953, p. 499.

§ Willi Heilman, *Alarm in Westen*, Weiblingen-Würt, 1951, p. 19.

WEAPONS RESERVED FOR TOTAL WAR

The definition of total war quoted in the early part of the present article spoke of the employment in it of "all available *weapons* and resources." In so doing it pointed to one of the distinguishing features of such war, which, though secondary to the feature examined above, is of practical importance. Total war cannot ordinarily be other than a war for survival. The belligerents, with so much at stake, will be more inclined than they would in lesser conflicts to bring into use weapons which they have been "keeping up their sleeves." They are weapons of great destructive power and they are very costly to produce. They are not, on the whole, in very ample supply, and a wise belligerent will naturally be disposed to reserve them for the big occasion and the worthwhile target. For that reason they are unlikely to be used in any war short of a total one: which is another reason why the latter kind of war is the worst of wars. That they will be used in it is a fairly common assumption, among Service chiefs at any rate. General Omar Bradley, chairman of the United States Joint Chiefs of Staff, said, for instance, in an address at a college in Florida on February 22, 1953, that bad as the war in Korea was, it was far less terrible than a world war would be, for that would entail the use of atomic weapons and the bombing of major cities. It may be so, and it is mere prudence to take precautions on the assumption that it will be so. It is, however, an assumption which is not without its dangers. "So long as the view persists in high military and political circles," says Professor Bernard Brodie, "that *any* war which brings the Soviet Union and the United States into direct and open conflict *must* be total, so long will preparatory measures be adopted which insure that the opening of hostilities does in fact precipitate total war.§

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* *Statistical Digest of the War, H.M.S.O. and Longmans*, 1951, p. 20.

† M. M. Postan, *British War Production*, 1952, p. 304.

‡ *Summary Report* (*European War*), 1945, p. I. Perhaps this estimate was in the mind of J. A. Field in his Introduction (p. XIII) to *The Struggle for the Mediterranean*, 1939–1945, by Rear-Admiral Raymond de Belot, 1951, where he states that 45 per cent of British war production was devoted to the Royal Air Force; he cites no authority. Nor is any given by W. H. Hessler for the highly dubious statement (*Operation Survival*, 1949, p. 113) that Britain's *strategic air offensive* absorbed "roughly half of the civilian war effort." Lord Tedder's statement (*Air Power in War*, 1948, p. 87) that only 7 per cent was so absorbed is no less dubious.

§ *Nuclear Weapons: Strategic or Tactical*, in *Foreign Affairs*, January 1954, p. 229.

Another view is, however, possible. This is that if a third world war comes, and if it does it will inevitably be a total war, in all probability it will be one between the North Atlantic Powers and the Communist *bloc* of nations. The former are likely to have a larger stockpile of weapons of mass destruction than the latter. *Per contra*, the western nations, so far as they are European, are less favourably placed on a strategic bombing map. Their cities are more exposed to attack than those of the Soviet Union; they have not the protection of the great distances which the latter enjoy. For that reason the western Powers may hesitate to inaugurate a mode of warfare that might be more damaging for them than for the enemy; and if they do not take the initiative, it is improbable that the other side, who will be less amply supplied with weapons of this category, will do so. The weapons may thus become mere *bruta fulmina* held in reserve, and that—who knows?—may be the purpose which fate destines them to fulfil. It is possible that the progressively elaborated technique of mass destruction will have its end and its justification in its result of averting the situation in which alone occasion would arise for putting the technique to the test.

SIR JOHN SLESSOR'S SUGGESTION

In a talk in the Third Programme of the B.B.C. in February, 1954, Marshal of the R.A.F. Sir John Slessor said: "I think a revolution has occurred and that the era of total war is over—so long as we do not take leave of our senses and agree to atomic disarmament."* Later, he suggested that the parties (including Britain) to the Brussels Treaty of 1948 should, with the addition of the Federal German Government, the United States and Canada, conclude a new treaty of collective security and that Britain and the United States should append to it an undertaking to use their atomic air power against any aggressor. There are two grave difficulties about this proposal. The first is that it would be almost a Gilbertian situation if the two powers pledged themselves to use against an aggressor the very weapon which, because it was thought too horrible to be used, they and all the other United Nations placed in January, 1946, on their "little list" for elimination from national armaments, the sole reason why the ban is is not already in force being Russian disagreement on the best way to make it effective. The change of front would be far too abrupt, it would show too cynical an indifference to everything that was said before, to be explained away convincingly. The second difficulty is that it has never been found possible to define "aggression." International conferences have tried to do so on a number of occasions and have had to admit failure. Aggression is not as simple and straightforward as assault and battery. The story of the start of many a war is a kind of glorified Whodunit.

TOTAL VICTORY

Total victory is the natural end of total war. Nations are less inclined to fight to the last ditch in the lower category of wars. A peace of compromise, of half-success, is often the end of the latter. It was so in Korea. When the armistice was signed there *The Times* asked in a leading article on July 27, 1953: "Is war, once begun, always to be pursued without thought of an end short of the surrender of the enemy?" The answer given to that question was No. There was wisdom in limiting the aim, which in Korea was the containment of the aggressor, and in not pursuing the war to the bitter end. The Second World War, on the other hand, was fought out to the last. Casablanca put an end to any idea of a negotiated peace. Germany and Japan, the Allies declared in effect, must pass under the Caudine Forks. It was an unwise decision, for the effect was inevitably to prolong the struggle, yet it was, psychologically, the natural decision in a total war.

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* *The Listener*, February 11, 1954, p. 244; February 18, 1954, p. 285.

The war ended in total victory. It need not have done so. It would have been better for victor and vanquished alike if it had not done so. A host of post-war difficulties would have been avoided if it had ended in a negotiated settlement in the autumn of 1944. That was a practicability. Mr. Lloyd George's suggestion made in the House of Commons on October 3, 1939, that we should open peace talks then was not. It would have amounted to a shameful abandonment of Poland, for whose sake we and France had gone to war. Nor was it a practical possibility for us to drop out of the war when the Germans attacked the Russians in June, 1941. A repentant Russian Communist has suggested that our right policy then would have been to let the totalitarians destroy one another and to save our own forces.* But the position in the summer of 1944 was quite different. The Anti-Hitler plot of July might well have succeeded if the Allies had played their cards more cleverly. Mr. John Wheeler-Bennett's conclusion that it was better on the whole that it did not succeed is hardly convincing. "To have negotiated a peace with any German Government—and particularly one which had come into existence as a result of a military revolt—would have been to abandon our declared aim of destroying German militarism. . . . It could not then have been foreseen that, having twice defeated Germany in a global war in order to destroy her military potential, they (the Allies) should later—under the irresistible pressure of events—be forced, *malgré eux*, to rebuild that potential, to a great extent at their own expense."† There is, however, one argument on the other side to which Mr. Wheeler-Bennett does not seem to give sufficient weight. The Russian troops were then still outside Germany's eastern borders. It was only at the end of June that they forced the lines of the Dnieper. The Vistula was not crossed until August 3, and the East Prussian frontier was reached only on August 17. If terms had been arranged with a provisional German Government at that time, they would have been such, in all probability, as to give the Western Powers a less precarious footing in Germany than they in fact were able to secure in the spring of 1945. They would not have been subsequently in the ignominous position in which they were placed *vis-á-vis* Russia. They would probably have been able, too, to deal with her on more equal terms, because of their occupational position, in regard to the settlement of peace problems with Germany and Austria. The demand for unconditional surrender would not have been insisted upon, Rommel thought, if the Normandy invasion had been beaten off.‡ Field-Marshal Kesselring's view was that Germany should have tried to make peace even earlier; he was convinced by Stalingrad and the disaster in Tunis that she had lost the war. "That was why since the autumn of 1944 I had supported S.S. General Wolff's plan to contact the politicians in Switzerland."*

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* Alexander Uralov, *The Reign of Stalin*, 1953, p. 240.

† John Wheeler Bennett, *The Nemesis of Power*, 1953, p. 692.

‡ *The Rommel Papers*, 1953, p. 485.

THE FAR EAST

In the Far East, too, the war would have probably ended sooner than it did if the Allies had qualified their demand for unconditional surrender. That was the very definite view of Mr. Joseph Grew, who knew the Japanese character thoroughly. He considers that if a clear statement had been made in May, 1945, that surrender would not mean the end of the dynasty and the Emperor Hirohito's rule, the "surrender-minded" party in Japan might have prevailed over the die-hards. "If surrender could have been brought about in May, 1945, or even in June or July, before the entrance of Soviet Russia into the war and the use of the atomic bomb, the world would have been the gainer."† So, too, Mr. John J. McCloy, who later became United States High Commissioner for Germany, considered that a political approach should have been made to Japan for the ending of the war in the early summer of 1945 and the use of the bomb thus avoided.‡ In the Far East, as in the west, a host of post-war difficulties might have been avoided if a negotiated peace had been substituted for the dictated one which the Allies decided to impose upon the vanquished.

In the west we went to war in the first instance to save Poland from enslavement, and in the second to prevent a single Power from establishing an unquestioned predominance in Europe. We achieved neither aim. We left Poland under a worse tyranny than Germany would have imposed upon her, and we left Russia more menacingly predominant in Europe than Germany would have been. We helped Russia to bite deeply into the west. The gallant Polish airmen in our service felt bitterly about that. One of them spoke of the "anger and despair" caused by the order to bomb Dresden in February, 1945, and thus to assist the Russian invasion. "If the Germans get me now," he said, "I won't even know what I'm dying for. For Poland, for Britain, or for Russia."§ It was, alas! for Russia. She alone profited from the Dresden raid, as well as from the raids on Lübeck, Rostock and some other German towns. "But for the western Allies' strategic air offensive," a German general has said, "the Russians would never have succeeded in penetrating into Germany."‖

THE CHARTER AND TOTAL WAR

Total wars are the worst wars. One would have expected that the framers of an international organisation created to ensure peace would make the prevention of them the first plank in their programme. That has not been done; on the contrary, the Charter of the United Nations as it was drafted and approved had the effect of taking such wars out of the class of wars to which the machinery of forcible prevention was applicable. It did so by giving each of the five great Powers a right of veto in the Security Council. Total war is hardly conceivable unless a great Power is engaged on each side, and since no Power is likely to refrain from using its veto when the use of collective force against itself is in question, it is true to say, broadly, that total war goes free under the Charter. The unsatisfactory position in this respect was rectified to some extent by the plan which was approved by the General Assembly on November 3, 1950, and under which the Assembly can be specially convened at 24 hours' notice if the Security Council is rendered impotent by a use of the veto, and can then recommend action, including the use of force when necessary, for the preservation of peace. As the veto does not operate in the General Assembly the gap in the Charter is thus closed, but the failure of the United Nations Organisation itself to make some provision for the international force which the Charter contemplated takes away a good deal of the remedial effect. The real safeguards against total war are to be found in the conclusion of regional pacts of defence such as the North Atlantic Treaty of 1949 and the mutual aid agreements entered into since then by the United States, Australia, New Zealand, the Philippines and Japan in the Pacific.

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* Field-Marshal Kesselring, *Memoirs*, 1953, p. 281.

† J. G. Grew, *Turbulent Era*, 1953, Vol. II, p. 1425.

‡ J. J. McCloy, *The Challenge to American Foreign Policy*, 1953, p. 43.

§ *Destiny Can Wait*, 1949, p. 169.

‖ General Herhudt von Rohden, in *Allgemeine Schweizerische Militär Zeitschrift*. French translation in *Forces Aériennes Françaises*, April, 1953, p. 96.

The regional agreements constitute a notable beginning of the approach by stages to the goal of world peace. Not less important was the action of the United Nations in face of the North Korean aggression of June, 1950. The United States had the honour of sounding the rally then and subsequently of bearing the chief burden of the sacrifices which the three years' hostilities involved. What was done then had the effect, in all probability, of averting a third world war. The tremendous effort of re-armament of the free nations which followed the aggression went far to restore the balance of power between East and West. Further, Korea showed how to prevent a limited war from extending and becoming a major war. The same care that was taken there to circumscribe the area of a war should prove no less effective in future limited conflicts. Whether such care will be taken is unfortunately doubtful, in view of certain statements made by American leaders since the hostilities ceased. Mr. Dulles, the Secretary of State, said on December 29, 1953, that if there were a revival of hostilities in Korea or an invasion of Indo-China, the reaction would not necessarily be confined to the particular theatre chosen by the Communists. On January 12, 1954, he made a further statement in which he said that the new American policy was "to depend primarily upon a great capacity to retaliate instantly by means and at places of our own choosing." President Eisenhower declined next day to amplify this statement but did not dissociate himself from it. What it meant, said Mr. Adlai Stevenson at Miami (Florida) on March 6, 1954, was that "if the Communists try another Korea we will retaliate by dropping atom bombs on Moscow or Peking or wherever we choose." The danger that a localised war may become a world war as a result is obvious. It is profoundly to be hoped that the United States Government will have second thoughts upon this subject. Limited wars are nasty little affairs, but it is the global, the total war that matters most of all.

J. M. SPAIGHT

CHAPTER XII

LESSONS OF THE KOREAN CAMPAIGN

By Brigadier C. N. Barclay

Introduction

The examples given in this article have been culled from a mass of evidence in the form of published official accounts, articles in the press, and conversations with individuals who fought in Korea. On close examination it will be seen that there is little new in these lessons: they are mostly old friends in modern guise. Even the political problems, outlined early in the article, have analogies, or near-analogies, in history. The purely military ones will be familiar to most officers who fought in one, or both, of the World Wars and in some the circumstances, and setting of the lessons, has not greatly changed.

It would seem that military men tend to repeat their mistakes and that the lessons of one campaign often have to be relearnt in the next—sometimes by the same individuals. The inference is obvious. It is clearly very much worth-while studying the mistakes of the last war as a guide to the future.

Since the introduction of the General Staff system in the armed forces of the leading powers in the middle of the last century, wars on a major scale have occurred at fairly regular intervals—the Franco-Prussian (1870–71), the Russo-Japanese (1904–5), the First World War (1914–18), and the Second World War (1939–45).

Up to the Napoleonic Wars the pattern of land fighting remained fairly constant for several hundred years. The horsed cavalryman and the marching infantryman, armed with hand-operated muskets, sword and lance, and later supported by cannon of strictly limited range and destructive power, changed very little along the centuries, and throughout that time it was a comparatively simple matter to forecast the nature of the next war. It was almost certain to be very like the last. Many factors have changed this age-old stability in the methods of land fighting—railways, the internal combustion engine, man's new-found ability to fly, automatic small arms weapons, the increasing range of artillery, the destructive power of conventional explosives and, more recently, the potentialities of nuclear warfare, the long-range rocket and the guided missile.

Modern experience is that no war is like its predecessor, and it seems likely that the next will see revolutionary developments in the methods of fighting. It is one of the duties of the General Staff to assess and forecast, the pattern of the next major war and to advise the Government on the best means of providing the necessary men, equipment, and military technique, to ensure victory. It can hardly be said that our own General Staff, or those of most other powers, have been very successful in this respect. They were entirely wrong before 1914, and not very much better before 1939.

One of the main difficulties is that minor conflicts, in between major wars, provide very little guidance and are instead often misleading to those attempting to assess the bigger problem. They are usually wars between minor powers with indifferent or obsolete equipment, or Colonial wars in which one side is very primitively organised and armed. When, therefore, we *do* get a minor conflict of the kind, and on a sufficient scale, to provide a guide we should make every effort to learn from it as much as we can. The Korean war of 1950–53 offers a chance of this kind.

In examining the lessons of this campaign it will be convenient to begin with high-level considerations and then taper down to the details of equipment and minor tactics.

Political Considerations

It has never been possible to separate political and military considerations, and to-day no problem of military strategy can be examined without consideration of political influences, which are often very complicated.

In the case of the Korean campaign political far outweighed military considerations when in June, 1950, the decision between peace and war had to be made in a matter of hours. For the Free World the military occupation of the Korean peninsula offered little strategic advantage and certainly not enough to compensate for the loss of life, and vast expense, which United Nations countries—particularly the U.S.A.—suffered in this campaign. Nor is the country of any particular commercial value. There were some industries in the North; but by 1950 they had not fully recovered from the war, the mineral wealth is undeveloped and food production for export is negligible.

The sole reason for embarking on the Korean war was to uphold the prestige, and authority, of the United Nations, and to show the Communist World that aggression does not pay. It was for a somewhat similar reason that China entered the war. The North Koreans failed to over-run South Korea; by the end of October, 1950, the North Korean Army had been practically destroyed and it appeared likely that U.N.O. would establish a United Korea. The only way for Communism to "save face" was for China, succoured by the Soviet, to enter the war on a major scale.

Thus a campaign designed by the aggressors to be all over in a few weeks, developed into one in which hundreds of thousands of men were deployed by both sides, lasting for more than three years and costing hundreds of millions of pounds. It remained localised, but was, nevertheless, a serious threat to world peace.

The lesson from this is that wars, once started, even on the smallest scale, are apt to grow in stature and last much longer than either side intend. Before embarking on hostilities it is prudent to examine the political factors most closely, and to balance very carefully the probable advantages to be gained against the burden which the war may impose. As far as Korea is concerned it would seem that both sides were seriously at fault in their calculations.

Once hostilities had started political considerations influenced military operations to a degree almost without parallel in history. Whether the

Chinese would have joined in if United Nations forces had not advanced North of the 38th Parallel towards the Yalu is an open question. It seems likely that they *would* have done; but less hastily and perhaps in a more veiled guise—on the lines of German, Italian and Russian participation in the Spanish Civil War. In their anxiety not to extend the area of hostilities the United Nations allowed the Chinese a "preserved" area in Manchuria in which they could hold reserves and reinforcements, base their aircraft, and in other ways succour their forces in Korea, free from bombing or any other form of attack. Consequently a resounding victory was beyond the capacity of the United Nations and the fighting ended in stalemate.

An incidental outcome, resulting from disagreement on this policy and its implementation, was that the American President was put to the acute embarrassment of having to dismiss General Douglas MacArthur, the chief avenger of Pearl Harbour, who had also, up to then, conducted the Korean campaign with such marked ability. By his victory over Japan General MacArthur had become a national hero—as was evident from his reception on his return to the United States—and his dismissal was in itself a political incident of significance and not without danger.

Again we see the importance of carefully considering every aspect of a campaign which is optional, before embarking on it. There are differences of opinion on the wisdom of going to war for ideological reasons, unless a swift victory is reasonably certain. We shall not find many people seeking protection, or liberation, if the price is to be the rake of war up and down their country, as happened in Korea.

THE VALUE OF COMBINED OPERATIONS

Although his military prestige was high, General Douglas MacArthur left the Korean scene under a political cloud. This may explain the fact that his counter-offensive in the autumn of 1950 has not attracted the attention which it deserves. After a fighting withdrawal to the Pusan "beach-head" with inadequate forces—organised for occupational duties rather than fighting, and indifferently trained—General MacArthur launched a counter-offensive which practically destroyed the very efficient North Korean Army and brought his own forces to within a few miles of the Manchurian border. This was a remarkable feat of arms, which was made possible by the effective combination of sea, land, and air power, and the bold conception of his plan. General MacArthur might well have employed his only reserve to bolster the tottering defences covering Pusan. That would have saved immediate defeat with certainty, but could hardly have resulted in the resounding victory which actually took place. Instead he sent the X Corps (of two Divisions) by sea to land on the West coast at Inchon. This cut the enemy's supply line and, combined with extensive air operations and a simultaneously offensive by the main United Nations forces in the South, produced moral and material disintegration in the enemy army.

General MacArthur possessed command of the sea and air and his plan was designed to exploit this advantage. He discarded the safe course and reaped the reward of a remarkable success, which is not dimmed by subsequent political developments. A similar, but even bolder, decision was made by the British government in the summer of 1940, when reinforcements of men and material were sent to the Middle East, despite the serious threat of invasion at home.

THE UNARMOURED BLITZKRIEG

The *blitzkrieg* methods employed by the Germans in Poland in 1939 and in France in 1940, and later with considerable, but less, success in Russia, are always associated with tanks. Although other arms, particularly lorried infantry, played a much larger part than is generally realized it is, nevertheless, true that armour played the predominant part, and that success was mainly the result of rapid thrusts led by armoured units. These victories gave the tank army immense prestige and by some the armoured *blitzkrieg* was held to be the permanent recipe for victory under most conditions. It is, however, often overlooked that the Poles and French were almost entirely lacking in anti-tank weapons, or effective obstacles such as mines. The tanks had a free run, almost immune from danger. Today the situation is very different. As a result of developments in anti-tank weapons the tank of the future will be a target for powerful missiles from all quarters—anti-tank guns and aircraft rockets which can penetrate the armour of any tank, and hand-operated "bazookers". In addition there exist anti-tank mines of greatly improved efficiency. Moreover, all this anti-tank equipment is issued on a lavish scale and tanks will be lucky if they meet *any* body of troops unprovided with anti-tank weapons of a powerful type.

In view of these developments, some of which have only taken place in the past 4 or 5 years, it seems almost certain that the easy tank victories of 1940 will not be repeated. Many people think that the tank is too conspicuous, and too difficult to conceal, and that it will fall an easy prey to modern anti-tank weapons unless it is very heavily armoured—in which case it will be too heavy and cumbersome for a "blitzkrieg" tank.

It has been suggested that highly mobile operations, on the "blitzkrieg" pattern, are not the sole prerogative of tanks, although we have come to assume that this is so. It maybe that a new type of "Armoured" or "Mobile" Division is on the way, based on Infantry carried in Armoured Personnel Carriers and supported by a few heavy assault tanks, self-propelled artillery, engineers, and close-support aircraft.

In "blitzkrieg" warfare *on the* 1940 *pattern* the nature of the terrain does not matter very much, as most tank movement was confined to roads. In face of *modern anti-tank weapons*, however, tanks would be forced to deploy off the roads and this would be difficult, if not impossible, in a mountainous country like Korea. With an Infantry force in Armoured Personnel Carriers the situation would be different as, when the necessity arose, the men would leave their vehicles and deploy on their feet—regardless of the type of country.

It would seem that General MacArthur's counter offensive from the Pusan beach-head provides useful data for the study of this problem. The speed of advance gave the operation a "blitz" character, it was conducted by lorried infantry supported by only a few tanks. The Tactical Air Force played a conspicuous part, the "air strike" by a few planes being a feature of most engagements. It may be argued that the North

Korean Army was of poor quality and consequently little can be learnt from this operation. This is not the case, however. The original North Korean Army was highly efficient by any standards. Its communications were extended, but it had not suffered heavily, when General MacArthur's offensive started.

Perhaps this matter hardly comes within the category of "lessons" from the Korean campaign; but the advance to the Manchurian border provides data for the study of a very important military problem—the question of whether the tank is still the best basis for mobile operations or whether its replacement, or partial replacement, by some arm which is less vulnerable and less conspicuous, is not due or overdue.

LOGISTICS

In this indecisive campaign it is probable that both sides were denied victory because they could not overcome the administrative, or logistic, problems necessary to sustain a decisive offensive. In consequence operations become more or less stabilised along the 38th Parallel. Both sides were successful in limited offensive operations; but, after the initial North Korean advance in 1950, and the U.N.'s counter-offensive, neither side appeared capable of bringing the campaign to a successful conclusion.

This condition was due to a variety of reasons. The country was mountainous and unsuited to armour. Operations on a large scale were canalised in the valleys. The Chinese ability to reduce administrative requirements far below the standard which the European considers essential, was largely off-set by the dislocation of their rear areas by strategic bombing. The U.N.s were handicapped by the poor road and rail facilities in Korea, which were insufficient to carry the vast quantities of stores and equipment which the Western soldier requires to support him in battle, and to provide a comparatively luxurious scale of creature comforts.

There is a clear lesson here for the General Staffs of the countries of the Free World. The problem of reducing drastically the administrative set-up in Western armies must be tackled. Much lip-service has been given to this principle, but no worthwhile results have so far been attained. Many thousands of administrative personnel, and many administrative establishments, were maintained in rear areas in Korea, and in Japan, to keep the single British Commonwealth Division in action. Within units of the Division itself a very large number of men were employed on non-operational roles.

The idea is prevalent that a Western Army can never match an Asiatic one in the matter of economy in administrative personnel, vehicles, establishments, etc. N.A.A.F.I. canteens, leave centres, E.N.S.A. concert parties, sports meetings, mess waiters, beer, cigarettes, and other conveniences—all on a grand scale—are regarded as essential requirements. So long as this frame of mind continues little progress will be made. We should adopt the view that there is nothing, absolutely nothing, which anybody else can do, or forgo, which is not equally possible to a British Commonwealth soldier.* Thorough investigation of our Army administrative set-up, and drastic reform, is long overdue. In making these investigations there is much we can learn from the Chinese Communists in Korea.

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* The Supply Problem is dealt with in detail by Major-General B. T. Wilson in another Chapter.

Any criticism levelled at our own Army on this score is also applicable to our American friends, whose luxurious standards in the field are a source of envy among their allies, and must often be a source of satisfaction to their enemies.

Air Supremacy

The Western World has come to place great reliance on Air Supremacy in an operational area. The idea that one side could be completely outclassed by the other in the air and yet maintain a high standard of operational efficiency on the ground for three years, without loss of morale, without noticeable shortages of ammunition and supplies at the front, indeed without any serious inconvenience, is hardly believable. Yet it was so. The Chinese overcame the difficulties of complete air inferiority in a remarkable way. No doubt this was partly due to the Chinaman's philosophical character, but it was not entirely so. The simplicity of their administration, their ability to work and operate by night, and their capacity to dig, were also important factors.

We must, however, be careful not to get a false lesson from this experience. Air inferiority would be much more serious for a Western Army —with its long administrative tail and highly-organised Lines of Communication and Base installations—than it was for the Chinese who dispensed with many of these luxuries. On the other hand Rommel in the Western Desert, and again in Normandy in 1944, was a very formidable opponent in spite of air inferiority.

Another point—in a conflict with Communism the West will always be heavily outnumbered, and air superiority is one of the means of redressing this disadvantage.

It would seem, however, that the Chinese have shown us that we are prone to exaggerate the dependence of land forces on air support. An army can still live, and operate efficiently for an indefinite period, without it.

Operating at Night

The British have never shown enthusiasm for night fighting. When their hand is forced, as it was in the Second World War, they attain a very good standard; but when peace returns they soon forget about it. Yet, great possibilities await an army which, with its attendant Tactical Air Force, can operate by night for long periods at a standard of efficiency approaching that which is normal by day.*

For the Chinese, handicapped by marked air inferiority, ability to carry out large-scale night movements, and to fight by night, was a necessity. Without this night technique it is doubtful if their armies in Korea could have kept the field. There is much we can learn by studying their methods.

Digging

The British have an inherent dislike of digging. This is not entirely due to laziness, but also to tradition. Our great victories on land have been won mostly by mobility and surprise and we look back on campaigns of position warfare with misgivings—the Crimea, Flanders 1914–18, and the vaunted Maginot Line of 1939–40.

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* Night Fighting is dealt with in detail, by Major H. B. C. Watkins, in another Chapter.

Nevertheless, in these days of shells, bombs and rockets of immense power, we have at hand, and available in limitless quantities, the best possible protection against these annoyances—the soil under our feet. It is not that the British soldier does not know how to dig; but that his leaders do not know when to order him to start digging. There is always a praiseworthy tendency to regard every halt as a purely temporary one, and to think that the forward movement (in the opening stages of a campaign it is often a backward one) will recommence very soon. Under these circumstances it is regarded as a waste of time to dig. If the halt *is* in fact to be one of short duration there is a lot to be said for this argument. On balance it may sometimes be better to accept some exposure to fire in order to get much needed rest. Nevertheless, the British Army is often slow off the mark to dig, due usually to lack of a timely statement of policy by the higher command, who are the only people in a position to judge whether operations are likely to be fluid or remain static.

It seems that we must relearn this lesson in every war—twice from the Germans and, more recently, from the Chinese Communists.

Reconnaissance before Battle

British training manuals have always emphasised the importance of reconnaissance. "Time spent on reconnaissance is rarely wasted", has become a platitude, and one which has often been parodied! No sensible person can doubt the value of having a good look before undertaking any operation of war; provided the time spent doing it, and the manner in which it is done, does not prejudice the success of the undertaking. In static warfare there is usually ample time, and opportunity, for very detailed reconnaissance. In mobile operations it is quite different. Detailed and cumbersome reconnaissance often gives the show away; surprise is forfeited and the operation prejudiced by delay when in close proximity to the enemy.

During some periods of the Korean campaign there were intervening areas of "no-man's-land" between the rival defensive positions, several thousand yards wide. The only contacts between the belligerents were patrol clashes, and when raids were carried out. In these conditions we were prone to expect that any offensive operation on a major scale would be heralded by a forward move by the Chinese, in order to gain contact some time before the attack was launched. Several times this surmise proved wrong. On these occasions Chinese forces, of considerable size, moved forward several miles, deployed in the latter stages of the movement, and came straight in to the attack without the usual process of resting, forming up, tactical reconnaissance, registration by artillery and mortars, and other preliminaries taught in Western military schools. Clearly some preliminary reconnaissance *was* carried out, but the fact was not disclosed and it was obviously very cunningly done. Moreover, in an offensive carried out in this manner the troops are deprived of rest, or even a "breathing space," which we generally regard as essential before an attack. A high standard of physical fitness is demanded for action of this

(U.S. Army Photograph)

Some of the United Nations Commanders in Korea. *February* 1954

Left to right—Lieut.-Colonel R. Pirlot (Belgium)—Lieut.-Colonel C. Kaulst (Netherlands)—Colonel N. P. Jiminex (Philippines)—Major-General H. Murray (British Commonwealth)—General Maxwell D. Taylor (U.S.A.—Commander Eighth Army in Korea)—Brigadier-General Kemal Akkurt (Turkey)—Lieut. J. Caldairov (France)—Lieut.-Colonel Wolde Hohannis Shita (Ethiopia)—Lieut.-Colonel Parti Yosakrai (Thailand)—Lieut.-Colonel C. Ortiz (Columbia)

kind, and it may be that these attacks lost some of their sting, and co-ordination, by depriving units of the usual preliminaries in close contact with the enemy who was to be assaulted. It cannot be denied, however, that this system offers two very important advantages. It results in almost complete surprise and it avoids casualties from defensive fire to a very great extent.

Obviously this method is not suitable, or necessary, on all occasions; but when it *is* it offers very distinct advantages, and is a technique which would repay close study and practice.

Working with Allies

The history of Allied Forces, and their co-operation, is not a happy one. Marlborough's relations with the Dutch are the classic example of ineptitude in this respect; but in more modern times difficulties have always arisen, and it has rarely been possible to avoid friction. In World War I the British and French were often at loggerheads, as were the Germans and their Austro-Hungarian allies. In World War II similar difficulties arose, particularly with the Free French and with the Greeks. General Eisenhower had a flair for co-ordinating allied forces, but even he could not prevent friction at times. In Korea the problem was a specially difficult one, as no less than 22 nations* provided service contingents of one kind or another—speaking different languages, with a diversity of weapons and equipment, requiring different forms of food and with different organisations, staff methods, and military technique. It was perhaps fortunate that American troops preponderated to such an extent that most national contingents accepted American methods whenever it was possible and reasonable to do so. It is recorded that our original 27th Infantry Brigade changed its staff nomenclature at a very early date, to conform with the American system. The Brigade Major became S3 and the D.A.A. and Q.M.G. carried out the duties of S1 and S4.†

Nevertheless, even between the two English-speaking allies difficulties sometimes arose. Mr. Eric Linklater in his book "Our Men in Korea" draws attention to a difference in military technique which might have resulted in serious friction between less reasonable, and amicable, allies. The second retreat south, soon after the Chinese came in, involved a withdrawal for many units of about 140 miles. American technique teaches that an operation of this kind should be carried out in mechanical transport at high speed in as few bounds as is feasible—one if possible. The British method is different; we prefer to maintain contact with the enemy by occupying a series of rearguard positions, forcing the enemy to deploy and inflicting casualties on him. Both methods have advantages and it is not proposed to argue their respective merits. The important point is that they *were* different, which obviously raised difficulties in an allied army at a critical stage of operations.

Many minor difficulties arose, due to different procedure in such matters as air support, wireless communications, delivery of supplies, issue of orders, discipline, etc. These difficulties were ironed out in the end, but it may be that with a little more foresight on both sides, some would not have arisen, and others could have been resolved earlier.

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* Australia, Belgium, Canada, Columbia, Denmark, Ethiopia, France, Greece, India, Luxembourg, Netherlands, New Zealand, Norway, Puerto Rico, Republic of Korea, Sweden, Thailand, Philippines, Turkey, South Africa, United Kingdom, United States.

† From a lecture by Major-General B. A. Coad, C.B.E., D.S.O. (who commanded the 27th Inf. Bde. in Korea in 1950), delivered at The Royal United Services Institute on October 29th, 1951.

The lesson is that one of the very first considerations, in a campaign involving allied forces, should be uniformity of procedure—or failing that a clear understanding of each other's methods. If the alliance can be foreseen—as in N.A.T.O., but not in Korea—the problem is much easier; but it will never be very easy. If we include all three Fighting Services it seems that for many years to come the English-speaking races will be the predominant partners on the side of Western Democracy in any future war. It seems not unreasonable, therefore, that other allies should use English in all written and spoken transactions; but here again there are great difficulties and 100 per cent. efficiency is hardly obtainable.

SHORTAGES, AND UNSUITABILITY, OF EQUIPMENT, CLOTHING, ETC.

The British Army with its world-wide commitments has to prepare for average, rather than particular, conditions. This also applies to the Royal Navy and R.A.F., but the effect is less marked. The British soldier may, at short notice, be called upon to fight in tropical heat in jungle, swamp or desert, or in bitter cold in mountains or wind-swept plain. Consequently he often embarks on a campaign without essential equipment, or with equipment of an unsuitable kind. Korea was not an exception. The 27th Infantry Brigade in the early winter of 1950, when the nights were bitter, and the Siberian wind was blowing, were in some cases still fighting in "Jungle Green" uniform designed for the tropics. A year later, when the Commonwealth Division had been formed, some important articles of winter clothing arrived late. The universal carrier proved unsuitable in Korea. The jeep was much better. Other British vehicles were a failure. Arrangements for preventing vehicles from freezing-up, for heating water, and cooking food during the winter were inadequate for some time. These are a few of the things which were not quite right, and no doubt the ideal in these matters is difficult to approach in the conditions of our Army. Nor can we afford to do as our American friends do on occasions—provide everything that can possibly be required and then, when the time comes, discard what is found to be unnecessary.

Nevertheless, these mistakes and deficiencies are not always inevitable, or even excusable. Surely, with the small force we had in Korea in 1950, it should have been possible to fly to Korea, or otherwise provide, winter clothing either before, or soon after, the troops arrived. Failure to provide it in time a year later is very difficult to excuse. The failure of the Universal Carrier should not have come as a surprise. Any Regimental Officer who served in France during the severe winter of 1939–40, in France or the Low Countries in the winter of 1944–45, or who has used them on training during a Scottish winter, knows that this vehicle is unsatisfactory in icy conditions, especially in a country of steep gradients.

Matters of this kind, which too often give cause for complaint, should be capable of remedy with a little study and thought. In our Army things which are available, but have to be transported a long way, often arrive late, because the time factor is not properly appreciated. If a new weapon is sent to a theatre of war for use in a particular battle, due to start on a particular date, it must arrive a considerable time before that date. It has to be unpacked and possibly conditioned in some way; sent forward and distributed among scattered units; and be issued to the men who are going to use it, who must also be trained in its use. Only when this process is complete is the weapon of any value. All this seems elementary, but it is very often not appreciated.

This is an aspect of administration, and staff duties, in which the British are not conspicuously apt. It is one which could be, and should be, remedied by study, the maintenance of detailed statistics of equipment in relation to varying climates and terrain, and by additional emphasis on its importance.

The Road-bound Soldier

The first American Divisions to arrive in Korea came from the garrison of Japan. They were under strength, not properly equipped for active operations in the field and their training had been hampered by the irksome routine duties of an Army of Occupation. These young American soldiers fought with great zeal and courage, and saved the situation in the early weeks of the campaign. It would, however, be idle to pretend that their technique approached perfection or was above criticism. A noticeable failing was their reluctance to leave the road and take to the hills, even when the enemy was known to be at hand. In consequence they were often ambushed in defiles, outflanked, and denied the observation and command of the battlefield which the occupation of high ground provides. This is a common fault among inexperienced troops in the hills, and one which is by no means unknown in the British Army. Our men in Norway in 1940 were outclassed in manœuvrability by the specially trained German Mountain Troops. In the case of the American troops in Korea in 1950 their inclination to cling to the road was accentuated by their comparatively lavish scale of transport. Mountain warfare demands a very high standard of physical fitness; a good, and partly acquired, eye for country by the leaders; the closest co-operation between arms—especially between Infantry, Artillery, and the Air Force—first class communications and a carefully worked out system for taking advantage of the high road speed conferred by mechanical transport. Tanks, in small numbers, are invaluable on the main axis road, and in some types of mountain country—including many parts of Korea—they can often operate in the foothills off the road. Indeed, our own tanks gained a great reputation in Korea for manœuvrability in the hills.

The technique of mountain warfare under modern conditions is not difficult to acquire by physically fit troops; but it presents difficulties if the "drill" has not been studied and practised in advance. We should see that our troops have this technique. The time spent will not be wasted, as much of it—particularly on the administrative side and in connection with communications—is applicable to normal operations. Except in deep snow, a lot of special equipment is not necessary, although some form of armoured (against small arms fire) personnel carrier would be a great advantage for the leading troops in an advance, and for the rear-guard in a withdrawal.

PATROLLING

During static, and semi-static, phases of the campaign there was often a very wide area of "no-man's-land" between the opposing front line troops—sometimes several thousand yards. From the intelligence point of view, and in order to maintain morale, it was very important to dominate this area by patrolling, especially by night. Since the first World War the British Army has greatly improved its patrolling methods. We no longer send out inadequately briefed patrols, hastily selected, and with unsuitable equipment and personnel. There are, however, two aspects of this subject which are still matters of opinion, and depend to some extent on the nature of the country, type of enemy, and other considerations—namely, the size of the patrol and the selection of personnel for patrolling. In the past it was considered correct to have small patrols for reconnaissance and larger ones for fighting; but with the improvement in handy small arms automatic weapons and their present lavish scale of issue, it would seem that small patrols are best for both purposes. Three or four men armed with a "Tommy" Gun, or similar weapon, can produce a very heavy volume of fire at short range, which is usually sufficient. The man-pack wireless set provides patrols with the means of calling for accurate and, if necessary, heavy artillery, or mortar, fire. The trouble with the large patrol is that it is conspicuous, increases the noise of movement, is difficult to control by night, and may often include soldiers unsuited to patrolling.

This brings us to the question of the selection of personnel for this kind of work. Are they to be selected for their known ability on patrol, in which case they become, in a sense, specialists or is every man to take his turn? This is a difficult problem on which opinions differ. The clumsy man, or one who is highly strung, is an obvious danger. On the other hand, the "willing horse" system is not very fair and may, in the long run, have a bad effect on the morale of the chosen few. Probably a compromise is best, on the lines that, as a general rule, every man must take his turn, with young and inexperienced soldiers *temporarily* exempt and a few, who are physically or temperamentally unsuited to exacting work of this kind, *permanently* exempt.

This is, of course, only one aspect of a very big problem—specialisation versus ubiquity—which crops up in every walk of life.

Although methods differed in units, Korean experience of patrolling confirmed the experience of the Second World War—namely, that patrols should be small, lightly equipped, armed with light automatic weapons, provided with wireless, and be selected from men who are not known, or likely, to be unsuitable for the job. We must be careful not to confuse raids and ambushes with patrolling. These usually involve a whole unit or sub-unit—often as strong as a Battalion.

AMMUNITION SUPPLY

In most campaigns one hears of occasions when troops—usually Infantry—engaged in some desperate battle run out of ammunition. No doubt occasions arise which make this inevitable, when every precaution to avoid such a calamity has been taken, but in spite of this it happens and nobody can be blamed. Nevertheless, when the words "ran out of ammunition" come into the narrative of an engagement one cannot but wonder if it really was inevitable, if everything possible *had* been done to prevent it. Many factors can contribute to ammunition shortage—bad fire discipline, the wastefulness of automatic weapons, bad communications and poor administration, or just some unexpected development which could not be reasonably foreseen. Actions of the kind when ammunition "runs out" are usually very desperate ones, and any deficiencies in training or administration are apt to be obscured by the glamour which subsequently falls to individuals and often surrounds the unit.

The old rules for conserving ammunition, and for timely replenishment, still apply. In addition, modern science provides new means of giving timely warning of shortage, and delivering ammunition in the foreward areas. The vast wireless net which covers the battlefield enables junior commanders to report the ammunition situation to their superiors very frequently. Aircraft (including helicopters), armoured cross-country vehicles and, in the near future, containers launched on the same principle as rockets should enable small arms ammunition to reach any part of the battlefield, and prevent shortage, provided the problem has been thought out in advance and junior leaders realise the importance of giving early warning of their requirements.

It is difficult to avoid the conclusion that in nearly every case when troops run out of ammunition the catastrophy could have been prevented by a better system and greater foresight. If the problem was given more study and greater emphasis, and received more consideration on training, the phrase "ran out of ammunition" could be almost entirely eliminated from our military vocabulary. It is more often due to inefficiency than to misfortune.

C. N. Barclay

CHAPTER XIII

THE ROYAL AIR FORCE TODAY

By Air Vice-Marshal W. M. YOOL

OUTSTANDING EVENTS OF 1953

NO SURVEY of the Royal Air Force of today would be complete without some reference to the outstanding events of 1953, a year that was particularly memorable in the history of flying because December 17, 1953, was the fiftieth anniversary of the first powered flights, made by the brothers Orville and Wilbur Wright at Kitty Hawk, North Carolina.

On July 15, 1953, the Royal Air Force staged the largest fly-past in its history, when 641 aircraft, including six of the new Swift swept-wing fighters, flew past Her Majesty the Queen at R.A.F. Station, Odiham, on the occasion of the Royal Review. This was the second Royal Review of the Royal Air Force, the first having been held by King George VI in 1937 at Mildenhall and Duxford.

The most notable event of the year was, however, the flight of the Canberra P.R.3 (Flight Lieutenant R. L. E. Burton, A.F.C., and Flight Lieutenant D. H. Gannon, D.F.C.) from London to Christchurch in 23 hours 15 minutes when winning the speed section of the London–New Zealand Air Race. This flight marked in a signal way the progress made in the fifty years since those first tentative flights at Kitty Hawk by bringing New Zealand within twenty-four hours of London. It was therefore particularly appropriate that the same aircraft and crew should have represented the Royal Air Force at the fiftieth anniversary celebrations at Kitty Hawk, when the aircraft left Aldergrove, Northern Ireland, in the morning and flew over the scene of the original flight at local lunch-time within a few seconds of its scheduled time of arrival, after a flight of eight and a quarter flying hours.

THE COST OF DEFENCE

For the first time since the post-war expansion of the forces was started in 1949, the total Defence estimates for 1954/55 show practically no increase over those for the previous year, the total being £1,639·9 million compared with £1,636·76 million for 1953/54, whilst the amount to be spent on the Air Force has similarly been levelled off at £537 million for 1954/55, which is slightly below the 1953/54 estimate of £548 million.

There has been a slight reduction in the amount of military aid received from the United States to £43,360,000 compared with £50 million last year, making the net total for 1954/55 £491,640,000 compared with £498 million for 1953/54. These figures compare with an expenditure of £200 million on the Air Force in 1948/49, the year expansion started, and provides some measure of the growth of the Force in the intervening years.

The reason why there is a small reduction in this year's expenditure is that the planned programme for training, works services, equipment and stores has passed its peak, and this has more than counter-balanced the increased expenditure on aircraft, armament, petrol and oil. The main items for which provision is made include large deliveries of Swift and Hunter fighters, the first deliveries of Valiant medium bombers, and for the first time, some atomic bombs.

Altogether production and research account for £245 million, of which aircraft alone account for £165 million, and this is much the biggest item in the estimates, being almost half the total expenditure. The actual increase on production and research over last year is greater than is apparent from comparing last year's estimates with this. There were two main reasons for this, first, that production of the latest types did not come up to expectations and second, that cuts were made last year in the production of Canberra bombers and the older types of fighters following the review of our expenditure on defence. These two causes together have resulted in the total expenditure for the year being less than that originally extimated.

AIMS OF THE DEFENCE PROGRAMME

The principal aims of the Defence Programme were defined in the Statement of Defence, 1954, as,

> "First, we must maintain our resistance to World Communism and to Communist adventures and discharge our other peace-time obligations overseas. Secondly, we must, with our allies, build up the most effective deterrent against a major aggression which would lead to global war. Thirdly, we must do all we can, within the limits of our resources, to be prepared to meet such an aggression should our efforts to prevent it fail."

The Statement then goes on to describe the possible lines on which a future war might be fought as probably starting with a short all-out period of intensive atomic attacks, to be followed by a lengthy period of recuperation, or "broken-backed" warfare as The White Paper describes it.

From this it follows that the Royal Air Force has the major deterrent role in the prevention of aggression, and that in order to fulfil this role it is necessary to build up a force of modern bombers capable of using the atomic weapon to the fullest effect.

This concept of a short all-out war, to be followed by a lengthy period of gradual recovery, was first foreshadowed last year, and has led to a fundamental change in the reserve policy for the Royal Air Force. In future only those reservists, both aircrew and ground, who will be required immediately on mobilisation will be given annual training.

The calls on the Royal Air Force to meet the needs of the cold war have been comparatively small during the past year. Operations have continued in Malaya, and a few aircraft have been employed in Kenya against the Mau Mau, but there have been no major emergencies, and in particular no sudden calls for large numbers of transport aircraft. Transport Command has remained at its reduced size, and we continue to rely for additional aircraft in emergency on civil aviation, as for instance when reinforcements of troops had to be sent urgently to Kenya in April and September, 1953.

GUIDED WEAPONS

The Minister of Defence announced in the House of Lords on April 15, 1953, when introducing the Statement of Defence for 1953, that it had been decided that responsibility for the manning and operation of air-to-air and ground-to-air guided weapons should be given to the Air Force. The actual words used in his statement were as follows :—

> "We were now approaching the age of supersonic flight and that of the guided missile, and the results of the efforts which had been devoted to research and development in the past were now beginning to bear fruit. Our progress during the past year on guided weapons had been satisfactory. These weapons fell into two main groups. First, the air-to-air weapon which was expected to increase the destructive power of our fighter force by perhaps as much as fourfold. Secondly, the surface-to-air weapons which would be of the greatest importance to the safety of this crowded island against modern high-flying high-speed aircraft.
>
> The stage had now been reached when we could see that surface-to-air guided missiles together with the fighters of the Royal Air Force and the A.A. guns of the Army had a very important role to play in the air defence of the United Kingdom. Arrangements must now be studied for their introduction and operation as part of the air defence system, after full consideration of all the factors involved, it had been decided that the manning and operation of these guided weapons should become the responsibility of the Royal Air Force. This was the right decision because surface-to-air guided missiles were complementary to fighter aircraft and operated in the same air space and must, therefore, be under the same ground control.
>
> Their introduction would be a gradual process. For many years to come Regular and Territorial anti-aircraft regiments would continue to carry out an essential part in our air defence system. The employment of A.A. guns would have to be closely integrated with that of the guided weapons. The introduction of these weapons would, therefore, call for a continuance of the present close co-operation between the R.A.F. and Anti-Aircraft Command. These arrangements did not, of course, affect the responsibility of the Ministry of Supply for research and development."

This decision is obviously of the greatest importance to the future role of the Air Force and foreshadows the day, still far distant, when the conventional types of aircraft as we know them today may be obsolete. But it is clear, in spite of the progress being made in the development of guided weapons, that the fighter will continue to play the major part in air defence for a long time to come, and that it will only be possible very gradually for guided weapons to take over some of the tasks of the fighters and the anti-aircraft guns. An efficient control and reporting system will continue, however, to be an essential part of our defence whether piloted fighters or guided weapons are used.

In a statement issued in August, 1953, before his visit to Australia, the Minister of Supply outlined the progress being made in the development of guided weapons. This statement ended with the following words :—

> " In addition to missiles fired from the ground or from ships we have reached an advanced stage in the development of guided rockets to be launched from fighter aircraft. These will increase the killing power of our fighters many times over, and will enable them to engage an enemy bomber from a distance beyond the range at which it can defend itself with any conventional aircraft gun.
>
> Initially our efforts were concentrated on the problem of defence against enemy air attack. For this purpose a series of missiles has been evolved—some to be launched from the ground, some from ships, and some from fighter planes. While these anti-aircraft weapons will be the first guided rockets to be brought into service they will be followed by other types for use in various artillery and bombardment roles."

From this it might have been deduced that priority in research was being given to ground-to-air weapons, rather than air-to-air weapons, and there was some criticism of this in the press, in that the air-to-air weapon appeared to provide the most profitable field for development in the immediate future. This was in fact confirmed in the Statement on Defence, 1954, when it was made clear that the air-to-air weapon will be the first to come into service, followed by ground-to-air weapons at a later stage. The Statement went on to say, however, that "it will be some years yet before we have enough of these new weapons to bring about any very radical modification in the pattern of the United Kingdom defence effort." The most such weapons seem likely to do therefore in the near future is considerably to increase the effectiveness of our fighter defence. It does mean however, that for some years to come the cost of the development of guided weapons will continue to be an additional item in our defence budget, and that the replacement of conventional forces and weapons will be a slow and gradual process over the years.

EXPANSION AND RE-EQUIPMENT

The first squadron, No. 56, in Fighter Command was re-equipped with Swifts early this year, and further squadrons will follow during the year. Originally it had been hoped to have the first Swifts in service before the end of 1953, but delays in production and in the trials of these aircraft, as so often happens with a new type, resulted in their first introduction being set back some months. More than half the regular fighter force should however be re-equipped with the new types by next year. This will include Hunters, the first of which should reach the front line by the end of 1954.

The development of the Javelin, the future all-weather fighter, is going well. Pending its introduction a new mark of Venom has been produced for the night fighter role, and this, together with improved methods of fighter control, will result in a great increase in the effectiveness of our day and night fighter force. It was also announced during the debate on the Air Estimates that not only would the striking power of the fighter force be increased some nine times by the introduction of the Swift and Hunter, but that improved methods of control would enable twice as many formations of fighters to be directed against enemy bombers by next year as at present.

The first of the four-jet medium bombers, the Valiant, is likely to come into service during the year, and as these aircraft, together with the Victor and the Vulcan, become available in increasing numbers they will gradually replace the light twin-jet Canberra aircraft in the squadrons of Bomber Command, which have themselves replaced the Washingtons on loan from the United States, and which have now been returned.

The expansion and re-equipment of Coastal Command continued during the year, and is now nearly completed. Shackletons of improved design and performance are coming into service.

The Second Tactical Air Force on the Continent, which together with the contingents from the Netherlands and Belgium, forms the Second Allied Tactical Air Force, is completing its re-equipment with Venom fighter/ground attack aircraft in place of Vampires, and has received its full complement of Sabre fighter/interceptors from Canada and the United States. There will be a further increase during the year in our contribution to the Supreme Allied Commander's Continental air strength.

It was reported in the press on February 11, 1954, that a delta fighter-bomber, derived from the Avro 707 delta research aircraft, is being designed to meet a N.A.T.O. requirement for an inexpensive supersonic ground attack aircraft able to operate from temporary air strips in close support of ground forces. It was also reported at the same time that N.A.T.O. are interested in the Folland-Gnat lightweight fighter.

Overseas the roles of the Middle East and Far East Air Forces have remained much the same. The Korean armistice has brought operations there to an end, but in Malaya there has been some increase in air activity, including the more extended use of helicopters, whilst in Kenya Lincoln and Harvard aircraft are being used to assist in the operations against the Mau Mau.

MANNING

Although there has been a progressive increase in the striking power of the Royal Air Force there was a slight contraction in the strength from 277,100 in April, 1953, to 267,300 in April, 1954, but the numbers should remain much the same during the coming year. The main reason for the slight reduction in strength is that the flying training organisation, which was greatly enlarged during the early stages of the expansion programme, can now be somewhat reduced, and this has also enabled the Southern Rhodesia Air Training Group, where pilots and navigators have been trained for seven years, to be disbanded.

A disturbing feature has been the decline in aircrew recruiting during 1953, as only half the numbers came forward, 7,000 compared with 14,000 in 1952. In order to remedy this unsatisfactory position the Cranwell Scholarship scheme was introduced in November, 1953. Under this scheme boys who are selected as suitable for subsequent entry to Cranwell can obtain grants towards their education, and there was a very good response to the first scholarships announced under the scheme, some 300 boys applying for 25 vacancies.

Entries to Cranwell are only part of the problem, and however successful the Cranwell scheme may be it will not solve the aircrew recruiting problem in its entirety, as the majority of the aircrew do not enter the service initially through Cranwell, but have come in the main from the short service entry, a proportion of whom are selected for permanent commissions. As the short service scheme was failing in its appeal it has now been revised and in future all officers coming into the general duties branch, except through Cranwell and the Universities, will come in initially on a 12-year "direct entry commission." They will be allowed, if they wish, to leave the Service at any time after eight years, but most of those who wish to take a permanent commission and to qualify for pension will be able to do so. Those who do not obtain permanent commissions will get gratuities varying between £1,500 after eight years and £3,000 after 12 years' service.

At the same time, in order to improve the conditions of service of the middle ranking officers and of the senior N.C.O.'s and technicians, increases in emoluments for all three services were announced in the White Paper (Cmd. 9088) issued in March, 1954. As in the other services, one of the major problems confronting the Air Force is the need to persuade more men to sign on for longer engagements, so as to avoid the serious loss of the more experienced men which is taking place at present. Not only does this directly affect the efficiency of the force, but owing to the rapid turnover many more men have to be trained than would otherwise be necessary, which in turn means that an unduly high proportion of the more experienced men have to be employed on training duties in Technical Training Command.

In addition to these increases in pay, further concessions, also applicable to all three services, in regard to travel, leave and disturbance allowance for personnel overseas were announced during the debate on the Army Estimates. These measures, together with the pay increases, are designed to ease the lot of the middle ranking officer and to make longer service more attractive to the senior N.C.O.'s and skilled technicians.

Important changes in the policy for reserves were foreshadowed last year, and these changes have now been put into effect. They are designed to improve the efficiency of the Air Force on the outbreak of war and to ensure that only those reserves are kept in training in the future who will be able to take their place in the front line immediately on mobilisation. This new policy for the reserves results from the new strategic concept of a short all-out struggle, followed by a period of recuperation.

A start on this new policy was made last year, when 14 of the 21 Reserve Flying Schools then existing were closed down, and entry to the ground branches and trades of the Royal Air Force Volunteer Reserve was restricted to the more highly skilled trades. Since then it was announced in the House on January 20, 1954, that in future only operationally trained aircrew will be maintained in flying practice whilst on the Reserve, and that they will be kept in practice on the types of aircraft they would have to fly in war. As this can only be done in operational units or at those training units which are equipped with operational aircraft, the remaining 7 Reserve Flying Schools have been closed down.

An important measure designed to speed up the mobilisation of operational stations has also been introduced and is designed in particular to enable the Control and Reporting organisation to be put on a war footing with the minimum of delay. To this end a number of Reserve Flights are being formed, so that in future, when called up in an emergency or on mobilisation, the reservists in these Flights will proceed direct to their war stations instead of as hitherto passing through Personnel Transit Centres, with consequent delay. As far as possible the personnel for these Flights are being selected from men and women whose homes are in the vicinity of the stations, and a further advantage of the new scheme is that the reservists can be exercised as a team during air exercises, so that they will get practical training in the duties they will be performing in war.

As a result of the changes in reserve policy there are now a large number of R.A.F. reservists who will not be required during the first few months of a war, and who are therefore being given no annual training, the intention being to give refresher training, should these men be required later in the war, during the period of recuperation. The surplus of R.A.F. reservists is likely to continue as long as the Air Force has to call up many more National Servicemen to maintain the front line strength than are needed in the reserve. It was therefore announced on March 7, 1954, during the Defence debate, that a proportion of the R.A.F. National Service reservists who would not be needed on the outbreak of war would be made available for Civil Defence duties during the first few months. Some 30,000 of the reservists are therefore to be given Civil Defence training each year during their 3½ year period of reserve liability, and this training would enable them to be used in mobile columns, where they would be under military discipline, on the outbreak of war. Legislation will, however, be necessary to give effect to this decision and is being introduced.

THE FUTURE

A start has now been made in re-equipping the Royal Air Force with the first of the new swept-wing fighters, the Swift, and the first of the four-jet medium bombers, the Valiant, should be reaching the service by the end of the year. A stock of atomic bombs has also been built up, and it can therefore be said that the Government's declared aim, "to build up in the Royal Air Force a force of modern bombers capable of using the atomic weapon to the fullest effect," so as to provide "the most effective possible deterrent against a major aggression which would lead to global war" is well on the way towards being achieved.

By the time the Royal Air Force has been completely re-equipped with the new fighters and bombers, they will themselves, however, be obsolescent, so that apart from the research and development of guided weapons which may eventually replace the conventional types of aircraft, aircraft capable of supersonic speed in level flight are being developed as future replacements of the Swifts and Valiants of today. These aircraft will create new design problems, as the kinetic heat generated at these high speeds may well prove a limiting factor in the ultimate speed which it may be possible to attain. Once the problems of the sound barrier have been mastered, the problems of the heat barrier will reach an acute form around the 1,500 m.p.h. mark.

Another interesting development on which research is proceeding is that of devising a control system which will be able to handle both fighter aircraft and ground-to-air guided weapons, so as to avoid the additional expense of duplicate control systems during the transitional period when both are in use.

To sum up the position in the Air Force today, and its probable development in the future, it can be said that good progress is being made with the re-equipment of the Force with the new fighters and bombers, with improving the efficiency of the control and reporting organisations and with the development of guided weapons, but that the manning of the Force still gives cause for anxiety. In particular the numbers of aircrew coming forward is below the number required and there is a shortage of long service men, but the new measures introduced to improve recruiting should rectify the position.

Above all, the decision taken last year and re-affirmed in the 1954 Defence White Paper to re-equip the Air Force with strategic bombers capable of dropping atomic bombs ensures that the Royal Air Force of the future will be fully capable of fulfilling its appointed role as the major deterrent to any aggression. The White Paper also makes it clear that this will entail a gradual change in the direction and balance of our defence effort. Still greater emphasis will have to be placed in the future on the Royal Air Force because of the need to build up a strategic bomber force and because of the important role of guided weapons in air defence.

W. M. YOOL

CHAPTER XIV

TYPES OF WARSHIPS

By Rear-Admiral H. G. Thursfield

The whole subject of the nomenclature of ships of war is in chaos nowadays. Perhaps the most striking illustration of this is that one of the newest class of ships built for the Royal Navy—ships that were designed and built as what for generations have been known as "destroyers"—are now not classed as destroyers by the Admiralty, but are known by the clumsy and verbose designation of "Daring class ships". This seems to indicate that even the Admiralty themselves have not decided what they are, in the conditions of today, except that they are not "destroyers". That is not surprising, since the term "destroyer" has long ceased to bear the meaning that it had when first introduced into the Navy in the form of "torpedo-boat destroyer". Perhaps it is intended eventually to adopt the category "daring" as indicating a class of warship, as the Americans adopted the term "dreadnought"—without the capital initial—to indicate an all-big-gun battleship of the class of which H.M.S. Dreadnought, built in 1906, was the prototype. If any such intention is held, it will surely be necessary first to define what are the characteristics of a "daring", and the functions she is intended to fulfill, before summarising those factors in a fabricated name; and that does not seem to have been done as yet.

This is not the only illustration of the chaos in nomenclature which now obtains. The opinion is frequently heard expressed today that the battleship is obsolete, and that no more of them will be built in future. A variation of that aphorism is that "the aircraft carrier is the capital ship of today", though some writers on Service topics today, while agreeing with the first of these expressions, would maintain—as in last year's issue of "Brassey", that the aircraft carrier in turn is now obsolescent, if not obsolete. For these pronouncements to be entirely convincing, it would be necessary for them to be derived from, or at least to follow, definitions of what is meant by the terms "battleship" and "capital ship"; for neither of these is self-evident as were, for instance, the terms "torpedo-boat" or "torpedo-boat destroyer", when they were first adopted. Again, it would seem that some, at least, of the confusion in this province arises from the lack of definition of terms in common use.

Another example may be cited. We are told that the days of fleets, and fleet actions, are over; no more will the world see the assemblage of great fleets of powerful ships, fighting each other in sea battles after the pattern of Trafalgar, Tsushima, or Jutland. That pronouncement will probably command a greater measure of assent than the other two, not only because it is in no way ambiguous, but for other reasons as well. Yet we still note that the terms "Fleet Carriers" and "Light Fleet Carriers" are to be found in the most authoritative of all naval pronouncements—the Statement by the First Lord of the Admiralty explanatory of the Navy Estimates (*see page* 398). And in other documents, the expression "Fleet Destroyer" is to be found; the sense in which the latter expression is used, however, is not that of the plain meaning of the words—a vessel which destroys a fleet, or at least is intended to destroy it—but the newest and most powerful of "destroyers", which, in the days when there were "Grand Fleets", formed part of the Fleet, in distinction to the older and less powerful ships of the class which were relegated to duties that were regarded as subsidiary. Presumably the latest now to be built—the "Daring" class—would have been called Fleet Destroyers if they had been completed a few years earlier; and perhaps it is because the days of fleets are over that that designation has become quite inappropriate, and because there has not yet been time to work out a new classification for warships that the very polysyllabic title by which they are at present known has been adopted as an interim measure.

But still we have "Fleet Carriers"; and though that title might perhaps pass as distinguishing them from "Light Carriers", since the latter have also the epithet "Fleet", its use with either title is not altogether intelligible. It would surely be just as intelligible, and would save both paper and ink, if they were styled—as long as they are allowed to survive at all by those who hold that all the functions of large warships can be discharged by land-based aircraft—"Carriers" and "Light Carriers".

The fact is that naval nomenclature has been in a state of flux ever since the advent of steam and steel ousted sail and wood as the materials of the naval architect. For that development produced ships that did not fall into any category that had been appropriate in the sailing era. The first real "iron-clad", H.M.S. Warrior, was at first classed as a "frigate", because she carried all her guns on one deck, despite the fact that she was probably capable of blowing out of the water any wooden "ship of the line" which mounted three or four times the number of her guns. Later, that designation was recognised as being very unsuitable, and the Warrior, and her rather similar successors were classed as "Armoured Ships". In Lord Brassey's "Naval Annual" for 1886, the "Armoured Ships" are further subdivided into "barbette ships", "broadside ships", "central-battery ships", "turret ships", and "armoured cruisers", besides some smaller craft which had to be placed in the armoured category because, though small and insignificant, they were fitted with some armoured protection. It was not until 1889 that the term "battleship" came into general use as denoting the first four of the above classes of Armoured ships, and it does not appear to have been officially adopted for several years after that. The term is, of course, a shortened form of the old designation "line-of-battle ship", a clumsy version of the more picturesque earlier name, "ship of the line". But it was a logical name for, by its derivation, it indicated the functions of the ships it described.

Not so the next category which, in the 1886 "Brassey", quoted above, was "Unarmoured Cruising Ships", also divided into various sub-categories, "2nd and 3rd Class Cruisers", "Corvettes", "Sloops", and various lesser craft—it is of interest to note two things about this classification, that Corvettes of that day were substantially larger than Sloops, and that the designation "frigate" still survived in three ships, the Inconstant, Raleigh, and Shah, which were by no means the oldest in the list. It will be seen that the name "cruiser" was already well established in naval nomenclature, ships of that class being divided into "Armoured Cruisers", "2nd class Cruisers", and "3rd class Cruisers". It was obviously a convenient term, as denoting the ships which came next, in fighting power, to the battleships, but were not themselves "fit to lie in the line". But it did not in any way describe the functions of the ships so described. Why it should have been adopted in displacement of the time-honoured name "frigate", it is difficult to conceive. "Frigate', of course, is no more descriptive of functions than "cruiser", but it was well-known and it seems a pity that it should have dropped out of use for no better reason, I suspect, than the theory that steam and steel had rendered everything of the wooden sailing-ship era so obsolete that even its nomenclature must be scrapped also. It has been brought back in our own time to denote something quite different from its old meaning, after not having been heard in naval parlance, since the disappearance of the three veterans mentioned above, for nearly half a century.

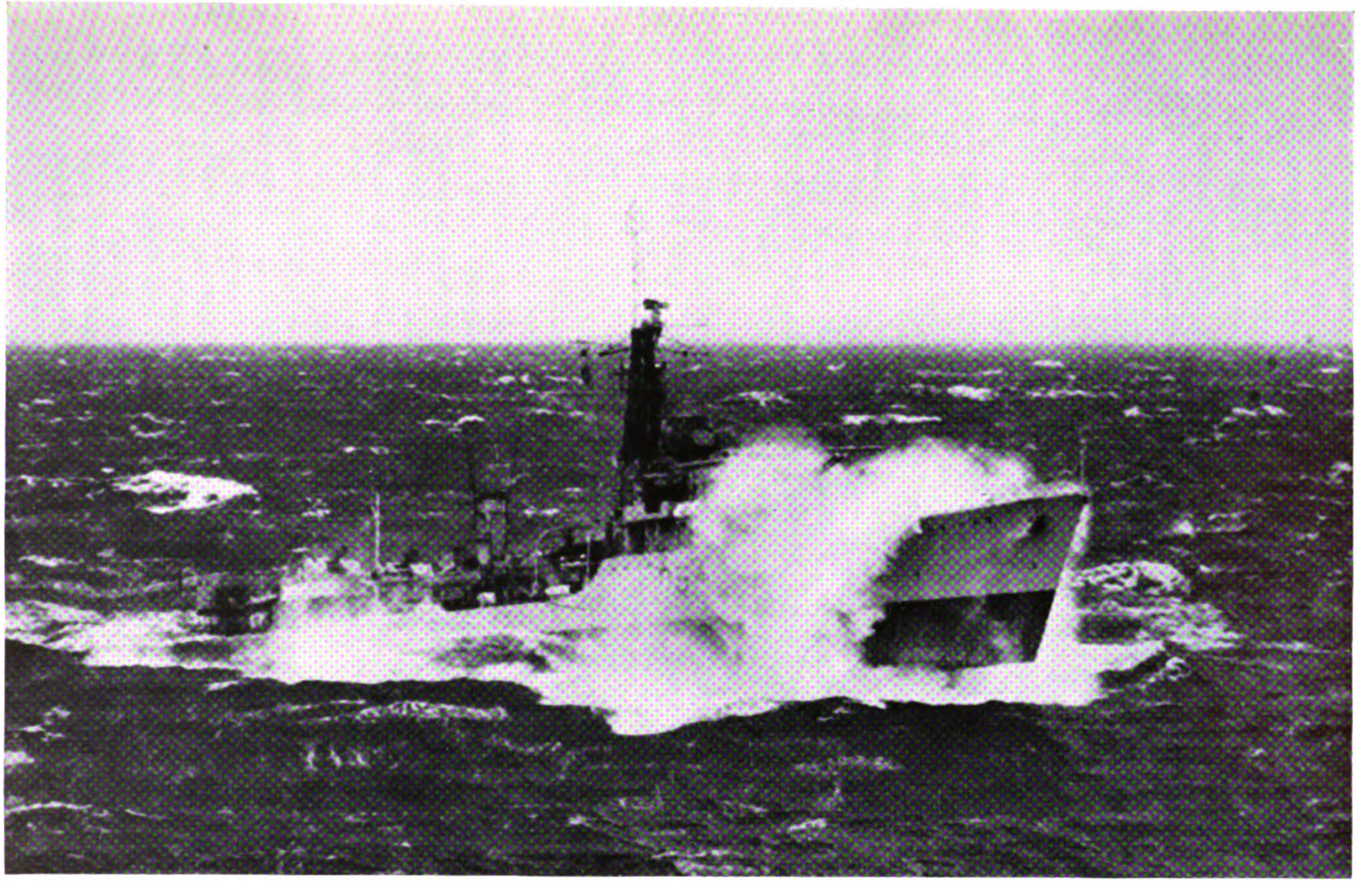
It does not appear, indeed, that the functions of the ships classified as "cruisers" had been worked out with any clarity, either at the period of the last century to which reference has been made above or indeed much later. Nearly thirty years ago the present writer, in a lecture which he had been invited to deliver at the Royal United Service Institution on "The Functions of the Cruiser in relation to Imperial Needs", discussing by way of preface the actual meaning of the name "cruiser", revealed that the only definition he had been able to unearth in all the Admiralty documents available to him, public or confidential, was "a craft especially designed for cruiser duties". That was not very helpful to his endeavour to find a starting point; but adopting the common conception of a cruiser as a ship inferior to the "battleship" but something larger than the craft which formed the "flotilla", and examining the duties upon which such ships had been employed in naval operations in the past, he found that "cruiser duties" had in fact been performed on various occasions by ships of every class and size, from the largest to the smallest.

That apparent anomaly was manifest again in the late war of 1939–45. It is not necessary to recapitulate here the analysis of "The Elements of Sea Power" expounded so clearly and concisely by the late Admiral Sir Herbert Richmond twenty years ago in his "Sea Power in the Modern World"; but I may perhaps take from it the generalisation that the chief functions for which cruisers have been directly provided at all periods have been the defence of the sea-borne communications, both economic and military, of the nation—the security of which is the ultimate object of all the operations of a navy—and of the communications of a fleet itself. The number of cruisers required by the Royal Navy was, for generations up to the late war, worked out on the basis of the volume and world-wide distribution of the sea-borne communications of these islands and the British Commonwealth. But in that war, it was found necessary to employ on the essentially "cruiser duties" of convoy protection in the Atlantic not only ships "especially designed for cruiser duties", but also the largest and most powerful of battleships, designed for quite other duties—when the enemy employed ships of that force directly in the attack on sea-borne communications—as well as the smallest and most lightly armed of sea-going vessels of the "flotilla" in the shape of the "corvettes" which came into service in 1940 and onwards. "Cruiser duties", that is to say, are no sure guide as to what should be the characteristics of a "cruiser" as distinct from the "battleship", of which we are told there are to be no more.

How is it, then, that the differentiation into classes of ships of war, from which we have taken the terms "battleship" and "cruiser" as if their meanings were self-evident, came into being? This question is easily answered by a very abbreviated version of Sir Herbert Richmond's analysis to which reference has already been made. The object of the fighting forces at sea—the executants of sea power, as he called them—is to obtain and exercise control of communication by sea. To attain that object, they must not only defend their own sea communications, but must also deny sea communication to an enemy. For the performance of these two functions, warships need be no more powerful in the first instance than is necessary to enable them to master the unarmed—or nearly unarmed—ships of burden in which, for the most part, those communications are carried. But if the enemy provides stronger forces at sea than such warships can overcome, then they in turn must be supported by warships of greater strength; a process which leads in due course to the appearance of the ship comprising the greatest measure of power which the technicians of the day are able to produce. The minor warships striving to exercise sea power in the sense defined above thus came each to be supported by a mass of force, under the cover and support of which it sought to achieve its object; and the decision as to which belligerent should gain and maintain command of the sea fell to be gained as the result of the trial of strength between those opposing masses in battle. Thus, for centuries, the "battleships", in which ultimately sea power rested, came to be the measure of naval strength; and the "battleship" itself was simply the most powerful warship that it was possible to produce at the time.

That standard, of course, was constantly changing, with the advance in naval architecture and its allied technical sciences; in time, the most powerful battleship of the day might be so far outclassed by her successors that she could no longer be regarded as "fit to lie in the line" and so entitled to be classed as a battleship—that has happened more than once within the writer's recollection. But still the battleship remained essentially the most powerful class of ship, and could not properly be defined in any other terms—except, perhaps, by reference to battleships of foreign navies which were possible enemies, which really amounted to the same thing. If that definition still held good, the pronouncement that there will be no more battleships in the present and future would be meaningless.

The definition, however, was perhaps too wide for popular adoption; for the common conception of a "battleship" came to be a warship possessing certain definite characteristics. The function of the battleship so evolved over many years being to overcome the massed strength of an enemy at sea (so that minor warships—the "cruisers"—could exercise command of sea communications without danger of being overwhelmed) it was obviously necessary that she should be able to take a certain amount of punishment as well as to inflict it. Thus was evolved the battleship which was, if not unsinkable—that dream has never been realized—able to withstand the blows of an opponent in battle for long enough, at least, for a decision to be reached. That was true of the wooden 3-deckers of Trafalgar no less than of the "super-dreadnoughts" of a later age. Thus the latter developed into ships which, mounting the heaviest weapons that the technicians of the day could produce, and their vitals protected by armour against an enemy's weapons of similar power, was necessarily



(*Official Admiralty Photograph*)

Exercise Mariner—H.M.S. Scorpion, destroyer, in Atlantic

limited in mobility compared with those degrees of speed and endurance with which it was possible to endow lighter ships. A ship embodying these characteristics, exemplified today by H.M.S. Vanguard or U.S.S. Missouri, is what is generally understood by a "battleship" today; and if that vary limited definition is accepted, it may well be—though it is by no means certain—that the day of these immense, and colossally expensive ships is indeed over. But before analysing how far this proposition is sound or can be accepted, there are one or two other points of nomenclature that it seems desirable to clarify.

The saying has been quoted that "the aircraft carrier is the capital ship of today". The expression "capital ship" was occasionally used in the sailing era to denote the heavier classes of ships of the line, from 1st-Rates of 100 guns down to 4th-Rates of 60–64 guns; but it does not seem to have had any different significance than the more ordinary "ship of the line", and it fell out of use for many years. It was revived again in the early years of the present century when Lord Fisher, proceeding on the curious theory that "speed is armour", was the prime mover in building a number of heavy ships in which the armour protection necessary to enable a ship of those days to "lie in the line" was sacrificed in order to enable them to reach, and even surpass, the normal speed of the lighter "cruisers". These hybrids were designated "battle cruisers", and as it was desired to devise a generic term that should include both them and the ships then recognised as battleships—on the ground, it is to be supposed, that they both mounted comparable armament—the term "capital ship" was revived for that purpose. Since the distinction between battle ships and battle cruisers was later to be extinguished when the technical advance in engineering made it possible to endow the former with the speed of the latter without sacrificing other qualities, the term "capital ship" has become meaningless, and it would be a contribution to clear thought on the subject of naval nomenclature to drop it altogether.

Turning to the designation "cruiser", it will be noted that it seems to have come in as a concise form of the rather clumsy title "unarmoured cruising ships" which has already been quoted as being official jargon of the 80's of the last century. Various classes were recognised from time to time thereafter. A distinction was early made between "armoured cruisers" and the rest; the latter came to be known as "protected cruisers" —having an armoured deck only—as against "armoured cruisers" which had side armour as well. The Armoured Cruisers developed into the Battle Cruisers, as noted above; but the category also extended downwards to form a class of Light Cruisers, so that, by the time that efforts began to be made after the Kaiser's War to effect some alleviation by international agreement of the immense financial burden of navies, the subject was in a state of no little confusion. The Washington Conference of 1921–22, which succeeded in concluding a general agreement to limit the strength of various navies in "capital ships", had then to reach an agreement what that term meant, and what were the other classes of warships which were excluded from that limitation. The latter proved none to easy; but eventually it was formally agreed that any ship which exceeded 10,000 tons, or mounted a gun of calibre larger than 8 inches was a "capital ship", and that ships which did not exceed either of those limits were "cruisers". The classification has survived to this day, and it would seem to be widely accepted that it is in some measure logical. Actually, it is wholly conventional, and if we are to be guided by realities, and not by mere words, in the important sphere of the composition of fleets today and tomorrow, it seems clearly desirable to recognise that.

Having eliminated some of the causes of confusion that are only too apt to arise from unthinking use of terms without regard to their real significance—or lack of it!—we can proceed to discussion of what really lies behind the pronouncements quoted, and how the chaos in nomenclature can be reduced. None would assert, it is to be hoped, that nothing beyond that confusion underlies the *obiter dicta*, quoted at the beginning of this chapter, of which the soundness has been called in question. Whether they are endorsed or not, there is a profound reality underlying those pronouncements; that reality is the appearance and development of the air arm, and its growing capacity for exerting influence on, and taking an important part in, operations at sea, which has profoundly modified the means and methods of putting into effect what the late Sir Julian Corbett defined as "Maritime Strategy".

This subject has been ably analysed by Captain Stephen Roskill in his first volume, published this year, of the Official History of the War at Sea. Professor J. R. Butler, the general editor of the United Kingdom Military Series of the History of the Second World War, has stated the object to which he and his team of historians have set themselves as "to present a single series of volumes in which the whole military story, and every part of it, is treated from an inter-Service aspect"—an object which of course has the whole-hearted support of "Brassey's Annual", which is dedicated to the maintenance of the basic partnership of the three Services as members of a single Defence Team, each with its own part to play but none sufficient in itself to victory in war without the collaboration of the others. In accordance with that principle, Captain Roskill has written, not a history of Naval Operations alone—which was appropriate after the First World War—but as his title indicates, a History of the War at Sea, which during its course came increasingly to be carried on by air weapons.

In his introduction, examining modern developments in the methods applied to putting Maritime Strategy into effect, he points out that air forces have demonstrated their capacity for adequately performing many duties at sea which, in the past, were regarded as exclusively within the powers of ships of war. The ship of the line, and her successor the battleship, came into being as the only weapon which could deal with an enemy ship of her own power; and her function came to be that of forming the "mass" of strength afloat, and seeking the destruction of the enemy "mass" so that other forces could exercise command of the sea free from interference. But air forces, at Taranto, Pearl Harbour, and eventually at Trömso, proved themselves capable, in certain circumstances, of assuming that function of the battleship. Amongst "cruiser duties", performed by lesser ships, an important one—omitted from the brief discussion in the earlier part of this chapter for reasons of space—has ever been that of reconnaissance; this too was one of the earliest to be performed by aircraft, and with their constant progress in range of action and endurance, has become one in which they have assumed an ever-growing part. In another sphere of "cruiser duties", in this case performed to a large extent by the smaller vessels of the flotilla, the close escort and direct defence, and attack, of sea communications themselves, air forces came also to take an ever-increasing share. Thus there is no sphere of naval activity in which the air arm has not proved itself capable of taking an important part. But—and the proviso is necessary—it by no means follows that because one arm is capable, in certain circumstances, of performing duties formerly only within the capability of another, that it can necessarily replace the other altogether. Because American battleships were destroyed by air action at Pearl Harbour, and Japanese battleships of incomparably greater power by the same agency in the Western Pacific three years later, some have urged that "the battleship is dead". It seems desirable to analyse that proposition more deeply.

It seems to rest upon the assumptions that the only function of the "battleship" is that from which she originally derived her name—the capacity to "lie in the line" to deal with an enemy's massed naval strength; and that, because that function has on occasion been successfully discharged by air forces, that no other force is needed for it. Neither of those assumptions is justified by the experience of the late war. In the Western Pacific, though the whole Japanese Navy had been eliminated, both the U.S. and British Pacific Fleets found it necessary to employ their battleships as escort to their aircraft carriers, bearing the aircraft by which the main attack on Japan was being carried on, in order to supplement the carriers' inadequate close-range defensive power against Japanese air attack. Moreover, the attack on Japan was supplemented eventually by the battleships themselves, Admiral Nimitz in his general report on the U.S. Navy's part in the War repeating Robert Blake's report to Oliver Cromwell that "After we destroyed the ships we plied our guns against the forts" (*See* "*Brassey*", 1948, *page* 543). The incidents that formed part of the Battle of Leyte Gulf, just after the American landing there, may also be cited against the latter of the two assumptions. The American amphibious forces in Leyte Gulf were threatened by the approach from the west of two Japanese naval forces, one through the Surigao Strait and the other through the San Bernadino Strait. The first was met, defeated, and practically destroyed by Admiral Kinkaid's 7th Fleet, consisting mostly of the older American battleships; of the second, the Musashi, one of the two largest battleships in the world, was first disabled and finally sunk by air attack alone, delivered by aircraft from American carriers. The threat was the same in each case; and in the event, it was more effectually and completely countered by sea forces than by air.

As regards the alternative employment for battleships quoted above, it may be argued that the British and American battleships were so used because they were available, rather than that the conditions of warfare of that day called for the provision of ships possessing the characteristics—heavy armament, strong defensive armouring, and great size—which constituted them "battleships". That may be so to some extent, but it is noteworthy that several years later, when hostilities began in Korea against an enemy who disposed of no navy and hardly any air forces, the American forces found it necessary to bring forward for service from reserve at least one of the despised battleships, which were thus found to be of value in hostilities of two widely different sorts and characteristics.

Both of these illustrations are drawn from the past—though not so very remote, be it noted—and lest I be accused of ignoring the march of progress, it seems desirable to analyse future conditions as well. In that connection, none will contest that if a new war were to start tomorrow, the sea communications of the N.A.T.O. Powers would be liable to attack far out at sea by the powerful cruisers which seem to have been specially built for that purpose by the Soviet Union—it is at least difficult to conceive any other purpose for which they have been built. If we enquire how such attack is to be countered, there can hardly be any other answer than that, in part at least, surface warships are demanded. The Western Powers are not so lavishly supplied with air forces that they dispose of enough to maintain complete control of the Atlantic, in all weathers in which the Russian cruisers could operate with devasting effect against convoys; though such air forces as can be spared from other essential defence functions would without doubt contribute to the defence at sea which is so vital to the Western cause. This situation calls for the provision of ships of force for escort duty, and though they might, at the moment be of the larger classes of what are called "cruisers", rather than "battleships", the tendency in naval competition has ever been towards increase in size and power, so that that condition might well prove to be only temporary. Whether what has to be provided be called a "cruiser" or a "battleship", ships of substantial power, both offensive and defensive, are clearly still needed.

Nor, indeed, is that the only possible call for such ships. In Chapter XXIV of this volume, the potentialities of the new "guided" weapons are examined in detail. And in that chapter, Admiral Nicholl foresees the possibility that possible developments in this direction may well call for ships possessing most or all of the characteristics of the battleship of today. A ship so armed is not limited to sea warfare; there are many circumstances in which she might be needed to play a part in operations of much wider scope. The conclusion from these considerations is that neither in the present nor in the clearly foreseeable future is it safe definitely to lay down that ships indistinguishable from the "battleship" of today have no place in the defence team.

All this argument has really touched only the fringe of the subject of the nomenclature of classes of ships; for it has dealt with names at present in use for the larger classes only. I have not attempted to argue the case for or against the aircraft carrier—that was very fully covered in the two chapters on the subject in last year's issue, and it seems unlikely that any responsible authority in this country would go so far as to abandon the provision of aircraft carriers in deference to the opinion of those who condemn them, in the face of the Admiralty's considered judgment that they are essential. Nor have I carried the argument down to the classes of ships that make up the "flotilla", beyond noting that the name "destroyer" has become completely illogical now. What has emerged from it, however, is that the designation "battleship" is today just as illogical as that of "destroyer"; and so, indeed, it must be conceded, has the designation "cruiser". Moreover, if the use of the term "battleship" be abandoned—for what is illogical must ever tend to be misleading—the term "cruiser" goes with it, since a cruiser, by the only definition that all the discussions at Washington in 1921 could evolve, is merely a ship which falls short of the characteristics of a "capital ship".

Precedent points the way out of the semantic chaos into which naval phraseology has fallen. The time-honoured name of "frigate" has, as already noted, been appropriated to a much smaller class of ship than it used to denote in sailing days; but it is too late to do anything about that now, and to vary it would create more confusion than it would clear up. Moreover nobody, not even the compilers of etymological dictionaries, know the derivation of the name, so that it cannot be regarded as misleading in the same degree that are the terms to which exception has been taken. Let the term "frigate" remain, indicating what the French call an *Escorteur*, and place any high and low limits of size for ships to which the name is given that seem appropriate. For ships above the "frigate" limit, revive the old term "rate", and call them "1st-rates", "2nd-rates", etc., down to the "Daring class ships", which will become 6th-rates. The old criterion of rating used to be the number of guns mounted, but that seems inappropriate today, when guns may possibly themselves be superseded by even newer weapons. Let the criterion be the numbers in their complements—for war, after all, is an affair of men—and there can then be no more confusion between as to what is a battleship, and whether there will be any more of them. The change need only affect fighting ships, as distinct from aircraft carriers which, if the unnecessary epithet "fleet" is dropped from their titles, are already appropriately and conveniently named, though they too could be given "rates" if it is desired to distinguish between classes of them. Only by the adoption of some logical system of nomenclature such as this, and the abandonment of the outworn terms which are neither descriptive nor generally understood, can the confusion of thought on the subject of the composition of sea forces, manifested in the pronouncements cited at the head of this chapter, be easily avoided in the future.

H. G. T.

CHAPTER XV

THE SERVICES FROM PARLIAMENT

BY IAN HARVEY, T.D., M.P.

UNDERLYING ALL that has been written and said about military policy during the past year are two major problems. The first is to strike the correct balance between military and civil expenditure. The second is interwoven with it: it is the necessity to find the resources to meet our commitments.

There is nothing particularly new about either of these two problems. What is, however, of major concern to everyone, be he soldier or politician, is that on the face of it we seem no nearer a solution than we did a year ago. What is even more disturbing from the point of view of the Government is that we are no nearer the solution than we were when the "Management" at Westminster was changed. Politically this situation reflected itself in the Budget when Mr. Butler made it clear that so long as we had to meet so great a defence bill, there could be no substantial relief in taxation for the taxpayer. That is not a particularly popular statement for a Chancellor of the Exchequer to have to make, even though at the same time he has imposed no new taxation.

The alternative to cutting down on defence expenditure is to cut down on expenditure on the social services. That is something which no progressive government would willingly do unless it could prove justifiable economies. The defence bill amounts to no less than £1,600 million compared with the social services bill which amounts to £1,300 million. These are formidable bills for a nation such as ours to have to meet.

There is a section in the House of Commons not associated with the present Government which appears to believe that military commitments are dictated by the military. It was pointed out in a similar article to this in last year's "Brassey" that our military commitments are entirely a result of our foreign policy, and our foreign policy is based essentially upon our determination to frustrate any potential aggressor.

This year a new consideration emerges which tends to complicate this question of commitments and resources. That is the development of what are termed "unconventional weapons." The reaction of the City Council of Coventry in rejecting all Civil Defence preparations is typical of the reaction of some elements of political and social opinion. For the soldier, however, this means only the highlighting of a problem that has always existed, namely that invention is nearly always so far ahead of development that certain weapons which are in current use must be obsolescent, even if not obsolete. The military problem is, of course, to draw the line up to which development must be expected to come so far as weapons in the hands of the troops are concerned. If that line is too near the latest point of invention it will mean that there will not be time to produce sufficient weapons to meet universal distribution. If on the other hand the line is drawn too far away, then it becomes obvious to those who handle the weapons that they are ineffective. That destroys morale quicker than anything else. Because of the rapid development of "unconventional weapons," or to be more precise, the Atom and the H-Bomb, a very high percentage of our present armaments tends to appear to be ineffectual. The vast strategic and tactical considerations involved in this new development automatically overshadow all political discussion because their impact on the political sphere is both immediate and long-term.

In the House of Commons there has been a discussion on the H-Bomb and our relations with the United States of America so far as its development is concerned. As Sir Winston Churchill so rightly pointed out, however much we may deplore the implications of these developments, it is very much better that they should be going on more successfully in the U.S.A. than in Siberia.

Nevertheless, such developments do mean that the expenditure of money upon "conventional weapons" will automatically be queried with greater effect by those who are the critics of all forms of rearmament. It should not, moreover, be considered disloyal on the part of those who support the Government's Defence programme to demand the most urgent examination of the programme and its speed of advance.

THE WHITE PAPER ON DEFENCE

The White Paper on Defence (*see page* 373) defines the principal aims of the country's defence programme as under:

> First, we must maintain our resistance to World Communism and to Communist adventures and discharge our other peace-time obligations overseas. Secondly, we must, with our allies, build up the most effective possible deterrent against a major aggression which would lead to global war. Thirdly, we must do all we can, within the limits of our resources, to be prepared to meet such an aggression should our efforts to prevent it fail.

The problem which World Communism presents is a dual one. It is both political and military. Communism, as originally implanted in the Soviet Union by Lenin, had in mind the inspiration of world revolution. The design of this was undoubtedly modified by Stalin; firstly because the internal organisation and the development of Russia demanded it, and secondly because the threat to the Soviet Union by Germany made it temporarily a subordinate issue. With the turn of the century it is clear that Soviet policy is tending to revert to the old model, the base having been made more firm and the opposition of Germany being eliminated.

The Soviet Union is strategically placed to create the maximum dispersal of its opponents resources throughout the globe. Its own numerical strength is vast. Its productive potential is tremendous. The British Commonwealth, dispersed as it is around the perimeter of this incendiary mass, is particularly vulnerable. The suggestion therefore that our resources can easily be withdrawn from our commitments is doubly dangerous. Politically it would leave the field free for Communism to operate through its network of agencies; militarily it would leave the enemies of freedom in a position to take action by force.

The second objective outlined in the Defence White Paper is the logical and obvious consequence of our experience over the past 25 years. The United Nations Organization has in it all the inherent weaknesses which destroyed the League of Nations. The one main difference has been the determination of the democratic powers to ensure that the responsibilities of the United Nations should be honoured by authority. That is the basis of the N.A.T.O. agreement, and of the proposed agreement in the Far East, both rendered necessary by the threat of Soviet aggression in those spheres.

It was Sir Winston Churchill who summed up the achievement of our defence policy in the Defence debate in these words:

> . . . that is the very point that constitutes the great improvement. It means that we may hope for a warning period or an alert. I attach the greatest importance to the creation of a warning period—I think I coined the word "alert" at one time and introduced it into the method of air protection. A period of alert means not only that immense precautions can be taken for the saving of life from an atom bomb raid, but also that in that period—please remember this—before firing is opened, short though it may be, even only a week or two, final efforts can be made to avert the supreme catastrophe; avert it, perhaps, even by a revelation of the strength which the allied forces possess in the atomic field. At any rate, I can assure all parties in the House that an alert period means not only a sure and substantial minimisation of the massacre but an additional hope of averting the conflict itself.

The Opposition decided to divide on the Defence debate. The reason that was given was that too much of the national economy was being spent on defence as compared with the rest of our national needs; that too much of that defence money was being spent on conventional military activities and not on research, and finally that there was no provision in the White Paper for the reduction at any time in the period of National Service. It may be argued that this was essentially a political amendment designed to unite all elements in a party which with its many pacifist traditions has had some difficulty in maintaining a united front on the issue of defence.

It fell to Mr. Strachey to justify the Opposition's point of view, and he produced the argument that we should seek to reduce our commitments of what he chose to call "the old imperial kind," and in particular to get out of Egypt. The mathematics of these proposals would not appear on examination to be particularly sound because the number of men released would not in fact make sufficient difference to change the existing position to any extent. Admittedly if the whole of our Commonwealth guard were dropped then we could cut our commitments and reduce the resources required. In the light of the arguments already outlined in the White Paper on the subject of World Communism, this is not a policy which the present Government could accept.

Mr. Strachey was also somewhat vulnerable on the subject of the reserve which he indicated did not exist and which he considered should be provided. Admittedly that is a weakness in the present position which no military authority would readily justify. A reserve, however, must be capable of meeting an emergency wherever it may occur. Any reserve held in this country would have to be ready to go at a moment's notice to the Far East. Those forming that reserve would have to be on a sufficiently long engagement to enable this to take place. To argue that the period of National Service should be reduced, and at the same time to demand a reserve, is not a logical procedure, even if it were conceded that other commitments could be reduced.

Mr. Crossman had none of Mr. Strachey's limitations. He was prepared to jettison the whole of our Commonwealth responsibilities in order that we might live more simply in what he described as "the small house." Mr. Crossman's argument of course omitted the important consideration that we are not occupying "the large house" for the privilege of doing so. We are looking after it to ensure that someone else does not come in and take it over. It would not be unreasonable to say that the critics of the Government's defence policy have in every case refused to accept the responsibilities to which we are committed, as a member of the Commonwealth, as a signatory of the United Nations Charter, and as a member of N.A.T.O. If their proposals were in fact accepted our foreign policy would become completely ineffectual.

THE SERVICE ESTIMATES

(*The various memoranda by the Ministers on the Estimates are to be found at the end of this volume in the Reference Section.*)

This year the Opposition restored the time-honoured tradition of "keeping the Government up" on Service Estimates. The debate on the Air Estimates lasted until 4 a.m.; the debate on the Navy until 6 a.m., and the debate on the Army until lunch time the following day.

In the debate on the Navy Estimates the First Lord added little to what he had already said in his Memorandum. As indicated in the White Paper on Defence, in new construction the emphasis remains on the building of minesweepers and anti-submarine vessels and on completing the aircraft carriers under construction. A new feature of the modernisation and conversion programme will be the introduction of the angled deck in aircraft carriers. Finally there will be a substantial provision of aircraft for the Fleet Air Arm.

The Secretary of State for War, Mr. Antony Head, performed a remarkable feat in presenting the Army Estimates without a single note. In the Memorandum which he had previously issued (*see page* 412) the procedure of including reports written from the various theatres of activity, which was a successful feature of the 1953–54 Estimates, was repeated. A valuable map showing the actual disposition of British and Colonial forces in January, 1954, was attached to this Memorandum, and it is to be found facing p. 434.

Mr. Head said:

> I hope those who consider defence matters closely will agree with me that the main problems of the Army today are four in number. The first, I would suggest, is to build up a strategic Reserve so as to restore the balance of the Army between forces overseas and those at home. The second is to recruit into and to retain in the Regular element of the Army an adequate number of Regular soldiers, particularly officers and long-service non-commissioned officers. The third is to retain in the Territorial Army an adequate number of volunteers for its administration and training. The last—and I do not put it last because it is the least important—is to ensure that the Army is thoroughly up to date in its methods, organisation and weapons.

It is in the Army alone that some reduction of front-line formations is in fact envisaged.

As Mr. George Ward indicated in presenting the Air Estimates, they include "For the first time provision for atomic weapons which are now being delivered to the Royal Air Force." During the course of the year a statement was made in addition that the Royal Air Force would be responsible for atomic ground-to-air weapons. It must be clear that the Air Force is the primary arm of our defence capable of implementing the policy of offensive defence. So long as the weapons which are designed for defence tend to lag in development behind the weapons of offence, the more important it is that offensive weapons should not be dispatched. The value of this rule was emphasised at the end of the last war in our dealings with the "V.2."

THE POLITICAL BACKCLOTH

The European Defence Community has been the subject of considerable debate, both when foreign policy and when defence have been discussed by the House of Commons. The most recent statement on the subject has been that made by Mr. Eden when he outlined the definite assurance to be given by the Government on the contribution that would be made permanently available to the European Army by Britain. The position of the Government had up to that point been clearly defined to the effect that we cannot as a member of the Commonwealth commit our resources completely to a military theatre which affects only a part of our responsibilities. It was not unnatural therefore that some of those who had demanded closer participation in E.D.C. should ask the Foreign Secretary why we could not go all the way and join. The principle, however, still holds, although we have in fact made a greater permanent contribution in the form of an armoured division and certain units of the R.A.F. than was ever previously outlined. The problem of E.D.C. is of course bound up with the other major issue which governs foreign policy and military discussions, namely the rearmament of Germany.

It would be accurate to say that on all sides of the House there is misgiving with regard to the policy of German rearmanent. The Conservative Party supports the policy of the Government, accepting it as the lesser of two evils. The Socialist Party is almost equally divided, Mr. Attlee and his followers taking the same view as the Government; Mr. Bevan and the pacifist element being opposed to it. In the Foreign Affairs debate, during which the subject was discussed, it was Mr. Attlee who outlined the important psychological effect of carrying the Western Germans with us in this policy. Even if his arguments are accepted, and there are many reasons why they should be, there must still be concern over the potential militarist and nationalist tendencies in Germany. Quite clearly the first thing that Germany wants is unity. At the moment that is out of the question owing to Soviet European policy. The next requirement of the Western Germans is security. As a divided nation they can best find this in allying themselves with the West.

Up to date the handling of the German situation by the Soviet Union has tended to strengthen the hands of the Western democracies, and of those in Western Germany who are prepared to co-operate in Europe. It must be obvious, however, that in the event of a clear offer of unity being made from Eastern Germany, and in the event of unhappy relationships with Western Europe developing the whole situation might swiftly be changed and Britain could be confronted with a demand for German unity on Eastern German terms, and with a united Germany looking to the East rather than to the West. The influence of Dr. Adenauer, and the wisdom of the British, French, and American Governments in particular, assisted by the clumsy tactics of the Soviet have made such a situation unlikely. Even so, it is not beyond the bounds of possibility.

All those who know the Germans and who have studied German history must realise that they are pre-eminent in the military sphere. Therefore if they are to make a military contribution to E.D.C. it will have to be on equal terms with the other contributors. This is, of course, an issue which goes hard with France. Nevertheless it would be a psychological blunder of the first order to expect a nation with such a military tradition to accept anything but a prominent military role. The only intelligent alternative is complete exclusion and that alternative might well lead to a reversal of the present state of affairs in Western Germany. Militarily we must be prepared for the emergence of a new German army taking its place with the other armies of Europe. Nothing more nor less is reasonable.

Those who clamour against the rearmament of Germany do not appear to be prepared to accept the alternative implications. Firstly we would have to maintain forces in a country which would automatically become more and more hostile. That would inevitably mean that we would have to have more forces. The fact that this would require an increase in our defence budget automatically runs counter to the demand by the self-same element in our political sphere that the defence budget should be reduced. Secondly, as has already been envisaged, the psychological effect upon Western Germany must be to turn them more favourably towards the East. That is to achieve exactly the opposite result to our declared aims in foreign policy.

While the Socialist Party has been divided on the issue of German rearmament, a similar division, though not of such great dimensions, has taken place in the Conservative ranks on the subject of Suez. This formed the basis of the Amendment debate during the course of the Army Estimates. The leader of the Conservative dissentients is Captain Charles Waterhouse, and weight has been given to his part in the affair owing to the fact that he is the Chairman of the Conservative Party's Defence Committee. He cannot be said, however, to carry the majority of that committee with him.

The Suez situation is not yet settled, but the gyrations of the Egyptian political hierarchy have made it impossible for any Government to enter for the time being into any arrangement on such subject which could be regarded as lasting. Unquestionably the most important aspect of Suez is not so much military in so far as it is no longer of such exclusive strategic importance as it used to be. It is primarily an issue of morale in the Middle East where any serious deterioration of the stock of the British Commonwealth and her Western Allies might lead to a general upsurge in favour of the Soviet Union and her satellites.

From the purely administrative point of view Suez without the cooperation of the Egyptians is an expensive proposition not justified by the results. Clearly a solution will have to be found which will guard our interests from the military angle and maintain our position in the eyes of the Middle East.

MILITARY POLITICS

Another issue upon which there has been considerable discussion has been National Service. Once again Mr. Shinwell has demanded the reduction of the period from 2 years to 18 months. The debate on the continuation of the National Service arrangements ranged mainly round the question of a regular annual review. Military authorities realise that this was primarily a political manoeuvre. Everyone knows that the conditions exist which provide for a continuous review of the military situation. As the Secretary of State for War asserted, no Government would willingly continue the imposition of National Service on a two-year basis. It is not a politically popular thing to do, nor is it economically in the national interest. From the planning angle the threat of a complete yearly change would make any coherent development impossible, and it is plain that this was never intended by the Opposition critics.

The whole argument with regard to reduction of the period of National Service centred around the issue of commitments and resources which has already been discussed. Not the most inspiring of arguments was that put forward by Mr. Shinwell to the effect that as other countries were not making so great a comparative contribution we should cut down ours. Such a negation of leadership would clearly not be accepted by the present Government, nor, it is suspected, would Mr. Shinwell have proposed it himself when in power.

A disturbing feature of the present operation of National Service has been disclosed during debate and at Question Time. It would appear that all those who are called up for the Royal Air Force as opposed to those called up for the Army are not now required to serve their subsequent three-year period with the voluntary forces. The reason for this is that the R.A.F. as constituted in peace time is not equipped to receive all these men, whereas the Army requires them. This does, however, invalidate the whole principle of equality of sacrifice in the matter of National Service duties.

Mr. Nigel Birch has now announced a proposal which has yet to be discussed which will draft these surplus R.A.F. men to duties with Civil Defence. An assurance is to be given to the effect that they will be available to the Civil Defence authorities for some considerable time after any outbreak of hostilities. Even so, it is a scheme which has many obvious drawbacks. The men concerned having been trained for R.A.F. duties are unlikely to be enthusiastic members of Civil Defence. Civil Defence authorities realising that these men will ultimately go elsewhere are unlikely to place any great reliance upon them. Consequently, the relationship at first sight does not appear very promising.

What is most significant about this proposal is the relating of the armed forces, even in a somewhat remote way, to Civil Defence. This year the subject of Civil Defence features more prominently in the Defence White Paper and there have been several demands in the House that Civil Defence should not only be called the "fourth arm of defence," but should rank as such. This would mean that Civil Defence would have to have a full representation on the Chief of Staff's Committee.

The creation of Civil Defence Mobile Columns which are likely to develop during the coming year are almost bound to impinge more closely upon the military front at home than the more completely civilian activities with which Civil Defence has been connected up till now. In the light of the development of the Atomic and H-Bombs, and of the considerations which have already been reviewed in this article, it seems probable that this is a sphere in which considerable changes are likely to take place.

It was natural that the Opposition should have made a political issue out of the "·280 Rifle story." A number of M.P.s were invited to fire the new Belgian rifle, as indeed they were previously invited to fire the British ·280 under the Socialist Government. The decision to adopt the Belgian Rifle has caused much heart-searching and undoubtedly the technicians who were responsible for our own British development have cause for considerable disappointment. There is little doubt, after studying the debate in the House, that the original mistake in the matter was made by those who treated the rifle as a purely domestic technical development. Such a development under modern conditions with our N.A.T.O. alliance and our United Nations commitments was short-sighted in the extreme. The ultimate political reactions have in some respects been no more broad-minded. Nevertheless what is required is a rifle which can do the job and which could be universally supplied from dispersed sources with the necessary ammunition under every condition, including those of extreme pressure and crisis. It is to be hoped that the Belgian Rifle, which is a good rifle, easy to maintain and to fire, will lead to this eventual consummation.

DOMESTIC AFFAIRS

The Secretary of State for War in particular has shown his clear appreciation that Regular recruitment will not prosper if the Regular Army does not measure up in living conditions and prospects to civilian occupations. The same applies to the R.A.F. and to the Navy. At the same time it must be admitted that in these other services the exhilaration of flying and the more modern conditions under which the R.A.F. has been conceived make this a less urgent problem in their case, whereas the more exclusive and traditional conditions of the Navy reduce the problem, if not in importance certainly in size.

To those who have the interests of the Services at heart, and who study these problems from the political sphere, one of the most disturbing aspects is the fact that quite a high percentage of senior and able officers find themselves at ages ranging from 52 to 56 with their Service careers ended and no other reasonable prospects.

More general are the problems of accommodation, family life, education, and civilian housing. The Secretary of State for War has indicated that he proposes to implement a vigorous policy of barrack building and reconditioning. It is no secret that on far too many occasions the sums made available for barrack improvements have been filched in the interest of economy. It has been a very false economy. It is to be hoped that the promises of the Secretary of State will make themselves more definite in the form of the early demolition of our most disgraceful barracks particularly at Windsor and in London and the erection of new and attractive buildings. It may be argued that a bedside lamp is not an essential, but that is no reason why men should be expected to live like horses just because they are in uniform.

The present dispersal of the forces throughout the world is making it increasingly difficult to keep service families together. The Canal Zone is of course one of the prime offenders in this respect. Arrangements which have been announced in the House for the air transport of soldiers on leave are an encouragement, but they cannot be regarded as a complete solution.

Of equal concern are the educational conditions under which the children of forces parents have to grow up. The changes, and the lack of opportunity often resulting, are very discouraging to those who wish to make the Services a career, and who at the same time want to give their children a chance in life equal to that enjoyed by the children of their fellow civilians. Although technically the machine exists for this to be done there is some reason to believe that local authorities do not co-operate to the full and pressure must be brought to bear upon them in order that they should.

Action must also be taken with the local authorities who are not prepared to accept Regular Service personnel on to their housing lists. It is absurd to demand that they should have had previous residential qualification when their mode of life has made this quite impossible. The Ministry of Housing and Local Government has indicated that it is not so far prepared to bring pressure to bear, and the Service Ministries have indicated that it is not a province in which they have any influence. This is a type of "buck-passing" which must be discouraged.

It is to be hoped that during the coming year action may in fact be taken, both in the sphere of education and of housing, to establish the claims of the forces as a matter of "right" as opposed to a matter "for consideration."

THE ARMY AND AIR FORCE ACTS

The Select Committee appointed to reform the Army and Air Force Acts will have completed its work by the time this Volume of "Brassey" is published. In so doing the Committee will have sat for two parliamentary years and will have issued four reports, of which the third, which contained the essential sections governing discipline, was the most important.

The Committee in its final form was composed as under:

Mr. G. H. C. Bing (Soc)
Mr. E. R. Bowen (Lib)
Wing-Commander E. E. Bullus (Con)
Col. Alan Gomme-Duncan (Con)
Mr. Ian Harvey (Con)
Mr. Arthur Henderson (Former Secretary of State for Air) (Soc)
Mr. James Hutchison (Under-Secretary of State for War) (Con)
Mr. H. B. H. Hylton-Foster (Con)
Mr. Basil Nield (Con)
Mr. R. T. Paget (Soc)
Brig. O. L. Prior-Palmer (Con)
The Rt. Hon. Sir Patrick Spens (Chairman) (Con)
Mr. Michael Stewart (Former Under Secretary of State for War) (Soc)
Col. George Wigg (Soc)
Mr. Woodrow Wyatt (Former Under Secretary of State for War) (Soc)

An important statement is contained in the Report on Part I wherein the Committee makes this observation:

> In reviewing Part I of the Army and Air Force Acts and the other Sections above referred to, your Committee have had particularly in mind throughout that the Regular Army and Royal Air Force no longer consist solely of volunteers but now comprise large numbers of young National Servicemen, doing their compulsory training. Your Committee have also had in mind that

> the Army and Royal Air Force are no longer confined to men but that women are full members of each Service, both as commissioned officers and enlisted persons. Having regard to these two points above, it will be appreciated how different the Army and Royal Air Force of today are from the armed forces of the Crown for whom the code of discipline embodied in Part I of the Army and Air Force Acts was originally intended. Your Committee have therefore found it necessary to recommend very considerable changes in the clauses which they have considered.

The Committee has also been determined to make statutory every regulation fundamental to military law and to take out of the realm of Queen's Regulations and Army Council Instructions anything that could be regarded as falling into that category. It is this principle that also guided the Committee in their approach to the regulations governing the Royal Marines which are now to be incorporated in the Army Act. This could be viewed as a considerable diplomatic achievement so far as the Board of Admiralty is concerned.

One of the most remarkable aspects of the Committee's whole deliberations and in particular the report which governs the most controversial aspect of the two Acts is the unanimity which was reached by all members of the Committee despite their varying views. This underlines the importance which has traditionally been accorded by Parliament to the necessity for keeping the armed forces above and beyond politics.

The constitution of courts martial which the Committee has now considered involved reconsideration of the recommendations previously made in the Lewis Report in 1946 and the Pilcher in 1950. Particular attention was paid to the position of the Judge-Advocate. The general view of the Committee was that the court martial is the next stage in the chain of military procedure after the Commanding Officer's orderly room. It should remain essentially a soldier's and not a civilian's court. The Advocate-General should not therefore be invested with a greater authority than the normal military representatives.

The Select Committee has had working with it a departmental committee whose chief representative has been Maj.-Gen. Sir Kenneth McLean. He has been assisted by Mr. C. M. Cahn of the Judge-Advocate's Department, and the parliamentary draughtsman has been Mr. P. H. Sée. The work that they have done in preparing the memoranda which are now published in their entirety will be of lasting value to all those whose task it is to study the military code. The service which Sir Kenneth McLean has performed in presenting these memoranda to the Committee and in answering questions of matters essentially military has been of a very high order indeed, and merits the gratitude not only of the Select Committee but of the two Services.

From time to time the Committee has called representatives of the Air Force, but generally speaking the terms of the two Acts are similar and General McLean has been responsible for putting the point of view of both Services.

By the time that "Brassey" is printed the Government will no doubt have made a decision with regard to the ultimate form of the Army and Air Force Acts and its presentation to Parliament. There are some important principles involved in this in view of the age-old tradition that parliamentary authority is required annually for the maintenance of a standing army.

IAN HARVEY

CHAPTER XVI

CANADA'S DEFENCE FORCES

By Brigadier M. P. Bogert

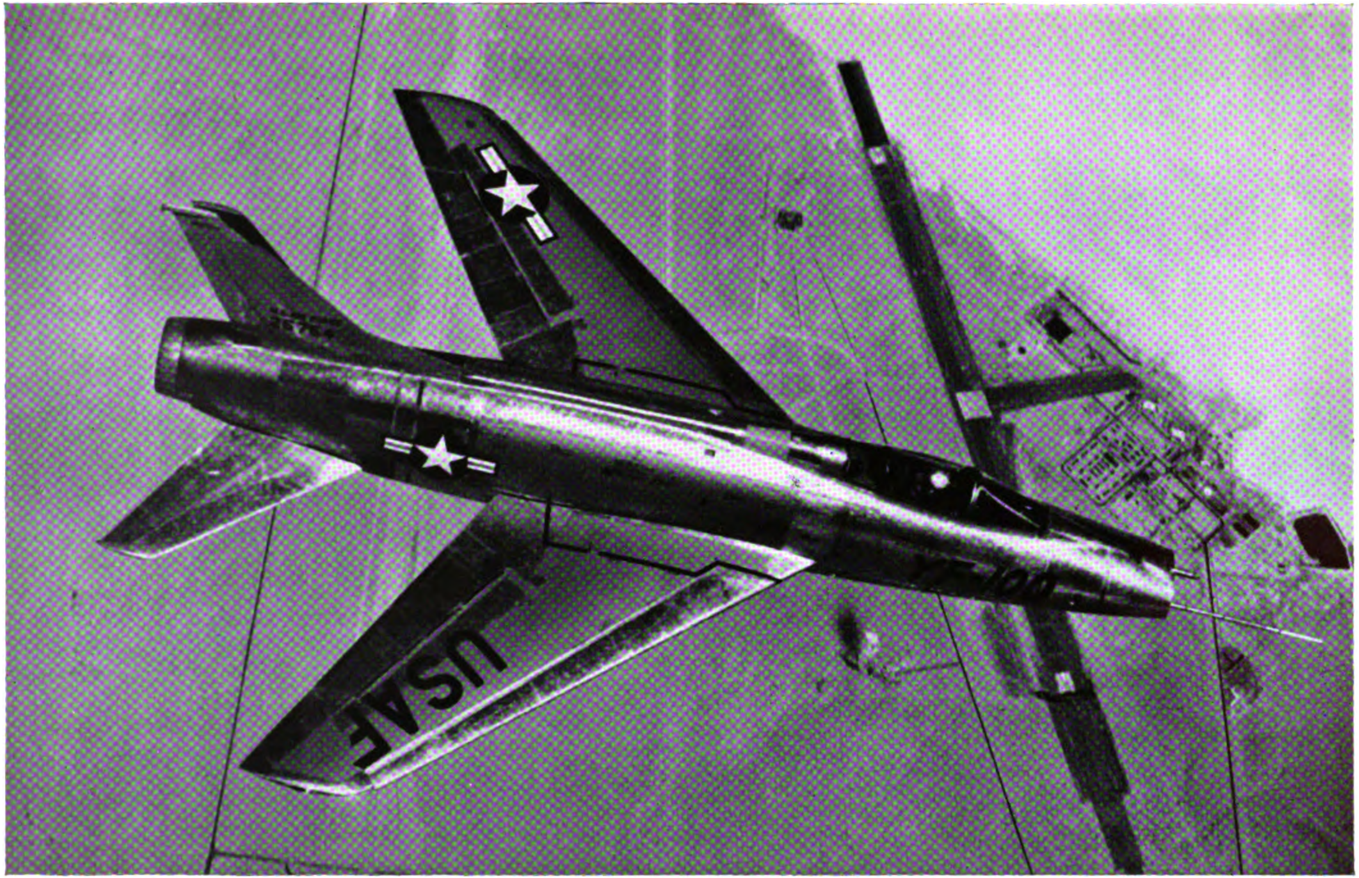
HISTORICAL BACKGROUND

As an article on Canada's defence forces has not appeared before in "Brassey's Annual," it is perhaps appropriate to deal at some length with their historical background. The history of the Canadian Defence Forces is as long as that of Canada itself. In the old British and French North American Colonies, colonial units fought beside regulars both in the sporadic fighting against the Indians and in the formal wars, first between the British and the French and later between the British and the Americans. Although there was never anything in the nature of a colonial fleet, it was not unusual for colonists to serve in the navies of their mother countries, and vessels of war were frequently built in the shipyards of what is now Canada.

Canadian militia served beside British regulars in the American Revolutionary War, and later Canadians fought the Americans both on land and afloat between 1812 and 1814. But after 1814 Canada enjoyed a period of peace, and, although—or perhaps because—the British government was prepared to maintain garrisons in Canada and to construct substantial fortifications at Halifax, Quebec, and Kingston, the militia was allowed to deteriorate. Under the laws of each of the provinces there was a general liability for military service, but little training was carried out and, except for the occasion of the rebellion in Upper and Lower Canada in 1837 when a number of militia units were embodied, the militia remained largely inactive until after the middle of the century.

The British Government not unnaturally considered that the North American colonies should accept responsibility for their own defence, and the reduction of British garrisons in Canada during the Crimean War emphasised the need for local defence forces, a need that became more obvious with the outbreak of the American Civil War and a reality when the Fenian Raids took place in 1866–71. It is to this period that the older of the Canadian regiments now in existence trace their history. The Fenian Raids, which are almost unheard of outside Canada, were perpetrated by strongly anti-British Irish republicans resident in the United States, most of whom had served with the Union forces during the Civil War. Although unimportant in themselves, the Fenian Raids were the first occasion on which any Canadian unit still in existence saw active service, and are the earliest campaign for which a battle honour is borne by a Canadian regiment.

In 1867 the British North America Act brought about the confederation of the original four provinces of the Dominion: Ontario, Quebec, Nova Scotia, and New Brunswick. A year later the first Militia Act of the Dominion of Canada was passed. Like the Militia Acts of the old provinces the new Act provided for universal military service in the event of a



North American F-100 Super-Sabre. Holder of world's speed record of 755 m.p.h., in October 29, 1953

levée en masse; it also authorised volunteer and marine components of the militia. The Act expressly provided for the continued existence of the volunteer corps of the old provincial militias.

The creation of the marine militia was a particularly interesting feature of the Act; for, although the Royal Canadian Navy did not come into existence until more than forty years later, the Naval Companies of the Canadian militia are its direct ancestors—ancestors for which, it appears, there is no reason to be ashamed, for militia gunboats saw active service at the time of the Fenian Raids and again soon afterwards in the Red River Rebellion.

The Red River Rebellion (1870) was an uprising of half-breeds in what is now Manitoba, brought about by dissatisfaction with the transfer of the administration of Rupert's Land from the Hudson's Bay Company, which had held it since 1670, to the Dominion Government. Coming so soon after the Fenian Raids the organisation of an expedition must have severely taxed the newly-formed Militia Department; but, with the help of British staff officers still in Canada, a force of British regulars and Canadian militia under Sir Garnet Wolseley was despatched, and order was restored. No doubt these early tests did much to stimulate the militia of the new dominion.

With the exception of the Halifax garrison, the last imperial battalion was withdrawn in 1871. In consequence, it was necessary to make new arrangements to provide for the instruction of the volunteers, a task which up to that time had been undertaken by the British regular garrisons, and the same year the first units of the Canadian Permanent Force were formed, two batteries which were used to establish schools of artillery. In 1876 the Royal Military College was opened at Kingston, and in 1883 were formed the Cavalry School Corps and the Infantry School Corps, afterwards to become respectively the Royal Canadian Dragoons and The Royal Canadian Regiment. When two years later the North West Rebellion, an uprising of half-breeds and Indians led by Louis Riel, who had instigated the Red River disturbance fifteen years before, made a military expedition necessary, the force was, with the exception of its commander, Sir Frederick Middleton, entirely made up of Canadian troops.

As in every part of the Empire, the outbreak of the South African War produced a wave of patriotic enthusiasm in Canada, and a second battalion of The Royal Canadian Regiment was quickly raised and sent overseas, soon followed by artillery and mounted rifles. The Canadian troops sent to South Africa were, it is true, paid by Great Britain (except that Canada made up the difference between Canadian and British rates of pay); but for the first time Canada had despatched a substantial expeditionary force to participate in a war abroad, and the Canadian militia had made one more step towards maturity.

In Canada as elsewhere the War disclosed some weaknesses in military organisation, and in the following years steps were taken to effect improvements, most of which were incorporated in a new Militia Act in 1904. Besides many other changes this Act no longer provided for the marine militia as it was intended to introduce a bill to bring the Naval Militia under the Minister of Marine. Unfortunately, the Minister of Marine died suddenly and the bill was not introduced, leaving the Naval Militia in abeyance, a state in which, unfortunately, it remained until 1910 when the Canadian Naval Service was created under the Department of Marine and Fisheries. With the creation of the Naval Service two old cruisers were acquired from Great Britain, and in 1911 a small naval college was opened at Halifax; but by 1914 the Naval Service was still pitifully weak. About 5,000 Canadians served with the Royal Canadian Navy during the Great War but the participation of Canadian naval vessels was limited to patrol duty off the east and west coasts; however, 1,700 Canadian officers and ratings were able to see active service with the Royal Navy.

The South African War had stimulated public interest in the fighting services, and in the following years the militia reached a very satisfactory state of efficiency. In the light of this, it is curious that, when in 1914 Canada went to war in support of the Mother Country, the Minister of Militia, Sir Sam Hughes, did not see fit to mobilise the volunteer units of the militia, but instead formed an expeditionary force which, initially at least, did not incorporate any of the existing units. Nevertheless, the mobilisation was efficiently carried out, and the 1st Division was in England by October, 1914, and in France by February, 1915. In due course five divisions and an independent cavalry brigade were sent overseas; although the fifth division had to be broken up and only its divisional artillery reached France. A Canadian Corps was formed in 1916, commanded initially by a British general, but from 1917 by a Canadian, Sir Arthur Currie. There is little doubt that the sense of pride which the existence and achievements of the Corps created contributed to the consciousness of nationhood that developed in Canada in the years following the war. 424,589 Canadians had gone overseas, and of these 60,661 had given their lives.

Although no effective Canadian air force was formed during the War, a large number of Canadians served with distinction in the Royal Flying Corps and the Royal Naval Air Service. In fact it seemed as if Canadians had a particular aptitude for air warfare. The formation of an aviation section of the militia had been discussed before the War and in 1914 a Canadian Aviation Corps was authorised, although little was actually done; however early in 1915 recruiting for the Royal Flying Corps and Royal Naval Air Service was begun in Canada. This recruiting continued throughout the War, and when it ended no less than 22,000 Canadians had served with the R.F.C., R.N.A.S., and R.A.F.

During 1918 Canadian squadrons had been formed within the R.A.F., and later both a Royal Canadian Naval Air Service and a Canadian Air Force were authorised; but their formation was not actually carried out before the Armistice. With the coming of peace it was clear that a great expansion in the use of aircraft, both civil and military, was about to take place, and an Air Board was formed in 1919 to control all aeronautical activities in Canada; the following year the Canadian Air Force was established on a non-professional basis, and in 1922 recruitment for full-time service to fill a temporary establishment of 52 officers and 238 airmen was authorised.

At the beginning of 1923 the Department of the Naval Service and the Air Board were consolidated with the Department of Militia and Defence to form the Department of National Defence. But post-war economies were now making themselves felt. The Navy, which in 1920 had received as gifts from Great Britain a cruiser, two destroyers and two submarines, placed the cruiser and the submarines in reserve and maintained only one destroyer and two patrol vessels on each coast; the Royal Canadian Naval College was closed. The Permanent Active Militia was limited to an establishment of less than 4,500 and the strength of the Air Force was less than 50 officers and 200 airmen. The headquarters of the Air Force (which became the Royal Canadian Air Force in 1924) was administered as a directorate under the Chief of the General Staff, and it was not until 1938 that it obtained an independent status equal to that of the other two Services.

For a decade the lean years continued; but from 1934 onward a gradual but steadily increasing expansion, particularly in the R.C.A.F., took place. Notwithstanding the expansion, however, Canada's defence forces in 1939 were, measured by any standards, extremely small. The Royal Canadian Navy with a strength of 145 officers and 1,748 ratings had only thirteen vessels ready for active service, and of these only six were classed as effective fighting ships; the Permanent Active Militia numbered less than 4,300 and was very far from being fully equipped with weapons of the latest design (it is doubtful if Canada differed greatly from her allies in this respect); the Permanent Force of the R.C.A.F. numbered 298 officers and 2,750 airmen, and possessed only 270 aircraft which were of no less than 23 different types.

Although Canada's regular forces at the outbreak of war were small, they were efficient and were supplemented by enthusiastic if also relatively small forces of volunteer reserves. Reflecting the mood of public opinion, expansion was rapid. The R.C.N. was immediately involved in the task of patrol and convoy duty, which continued without respite throughout the war; the Army quickly mobilised two divisions, the first of which was in England before the end of the year (mobilisation this time was on the basis of existing organisation); the first R.C.A.F. squadron to go overseas sailed in February, 1940, and, even more important, the R.C.A.F. had by that time already undertaken organisation and administration of the British Commonwealth Air Training Plan.

By 1945 the R.C.N. had reached a strength of 9,291 officers and 83,589 ratings, of which more than 5,000 were women; it possessed 939 vessels of all types, including 373 classed as warships. On land, Canada had for the first time an Army in the field, the First Canadian Army consisting of two corps, including three infantry and two armoured divisions, two independent armoured brigades, two army groups of artillery, as well as ancillary troops. By the time the Commonwealth Air Training plan terminated in 1945, 131,553 officers and men, including 72,835 of the R.C.A.F., had been trained under the Plan, and, in addition to administering the Plan, the R.C.A.F. had sent overseas 47 squadrons, of which nearly a third were heavy bombers.

What amounted to separate Departments of National Defence for Naval Services and Air, each under its own Cabinet minister, had been formed in the summer of 1940, but at the end of the War the three departments were merged once more. Inevitably the Services were quickly reduced in strength, but fortunately not to the pre-war level. By the end of 1946 the strengths of the regular forces were: R.C.N. 8,481; Army (no longer Militia) 21,473; R.C.A.F. 12,846. But the post-war grouping of nations and developments in weapons had combined to create an entirely new influence on Canadian defence: the threat from the north. If any uncertainty existed as to what immediate task the defence forces should tackle, the recognition of the northern threat removed that uncertainty. The R.C.A.F. had long been active in aerial survey in the north, but now it set about solving the problem of warlike operations there. In the Army special emphasis was laid on training for northern and arctic warfare, and the three regular battalions were converted to the airborne role. The Navy, although perhaps less concerned with northern operations than the other two Services, also gave the problem careful attention. The Defence Research Board, which was formed in 1947 with almost the status of a fourth service, also devoted itself to the question of northern defence.

KOREA

Training for northern operations provided a useful stimulus in the immediate post-war years, but developments in Korea soon presented an even more urgent task. It must be realised that the Canadian Services were designed for participation in a major war requiring the mobilising of the whole national effort; in two major wars Canadian regulars had trained the new armies but had not been required to help hold the enemy at bay until citizen forces could take the field. Participation in a small war was not contemplated. In consequence, the decision to contribute to the United Nations forces operating in the Far East posed an entirely new problem. Of the three Services the R.C.N. was probably the best prepared to engage in operations abroad at short notice, and in July, 1950, three destroyers sailed for Korean waters, where this R.C.N. force has been maintained ever since. At the same time the R.C.A.F. contributed a transport squadron equipped with North Stars, which has been employed on a shuttle service between Tacoma, U.S.A., and Tokyo. In the case of the Army, the Government decided to contribute a brigade group; but, as the three existing regular battalions had an operational commitment in the north, they could not be made available, and it was necessary to create an entirely new force, to provide the infantry element of which it was decided to raise second battalions of the existing regiments.

As a result of optimistic reports from the Far East it was thought for a time the whole brigade group might not be required, and in December, 1950, one battalion only, the 2nd Princess Patricia's Canadian Light Infantry, was despatched to Korea, where it became part of the 27th British Infantry Brigade. The remainder of the brigade group joined it in May, 1951, and in July the whole was incorporated in the 1st Commonwealth Division.

In due course third battalions of the three regiments, The Royal Canadian Regiment, Princess Patricia's Canadian Light Infantry and the Royal 22nd Regiment, were raised and formed into a reinforcement group to provide drafts for the Far East. After a year, arrangements were made for the second battalions to return from the Far East and assume the airborne role, releasing the first battalions for service abroad, and since then all major units have been relieved annually, personnel of other units being replaced individually.

THE NORTH ATLANTIC TREATY

For about a year after VE Day, Canada had contributed a division to the occupation forces in Germany; but, apart from that, she had never maintained an overseas garrison in peace, and the prospect of doing so seemed as remote as the possibility of participation in a limited war had seemed before the invasion of South Korea. Nevertheless, hardly were Canada's forces committed in the Far East when she found herself facing the task of providing an air division and a brigade group for service in Europe under the North Atlantic Treaty. This inevitably entailed a further increase in the strength of the Army, and a very substantial expansion of the R.C.A.F.

It was decided to create an air division and that it would co-operate with the United States Air Force in Europe, where it would become part of the 4th Allied Tactical Air Force; it was to be equipped with F86E Sabre aircraft, and was to consist of 12 squadrons, organised in four wings. Obviously the division could not be created instantaneously, and its formation was planned to extend over some two years; it is now complete.

In the case of the brigade group, it was decided that, unlike the air division, it would be in the British rather than the United States Zone, and it now forms part of the Northern Army Group. The raising of this force so soon after that for Korea might well have produced some man-power difficulties, and the co-operation of the Reserve Force (Territorials) was enlisted. Instead of raising further battalions of the existing regular regiments, certain reserve regiments were invited to form regular companies, and these were grouped to form battalions not only for the brigade group itself but also for a reinforcement group. Although the system of semi-independent companies was an effective recruiting expedient it did not make for unity in the battalions, and these have since been redesignated, forming new regiments.

Canadian contributions under the North Atlantic Treaty are not of course limited to ground and air, but the Canadian contribution at sea is in the sphere of N.A.T.O. Atlantic Command rather than that of European Command. The Royal Canadian Navy plays an active part in N.A.T.O. planning and has participated in a number of N.A.T.O. exercises.

THE DEPARTMENT OF NATIONAL DEFENCE

In Canada there are not separate government departments for the Navy, Army, and Air Force; the member of the government responsible for the fighting Services and also for the Defence Research Board is the Minister of National Defence. To relieve him of some of his burden of work an Associate Minister and Parliamentary Assistants are appointed. The senior civil official of the department is the Deputy Minister, and there are three Assistant Deputy Ministers, each of whom is concerned with a particular aspect of the civil administration of the department.

Since 1951 there has been a permanent chairman of the Chiefs of Staff Committee, who co-ordinates the operations and training of the forces and acts as senior Service adviser to the Minister and to Canadian government representatives at meetings of the N.A.T.O. Council. The members of Chiefs of Staff Committee are the Chiefs of Staff of the three Services and the Chairman of the Defence Research Board. The Committee deals with operational questions, and, in addition to the chairman and members, its meetings are attended by the Deputy Minister, the Secretary of the Cabinet, and the Under Secretary of State for External Affairs.

To advise the Minister on administrative matters affecting all three Services there is the Defence Council. The Minister himself is chairman, the Associate Minister deputy chairman, and the members are the Chairman of the Chiefs of Staff Committee, the three Chiefs of Staff, the Chairman of the Defence Research Board and the Deputy Minister. It might be supposed that the Defence Council performs a function in relation to the three Canadian Services similar to that which the Board of Admiralty, the Army Council and the Air Council in the United Kingdom each perform in relation to its own Service, but such is not the case; the Defence Council is advisory, and does not act as a committee in an executive capacity.

There are several other tri-Service committees, the most important of which are the Personnel Members Committee and the Principal Supply Officers Committee. As the names of these committees imply, they are concerned respectively with personnel matters and with questions of supplies, material and equipment as they affect the three Services.

To facilitate liaison, Canadian Joint Staffs are maintained in London and Washington; in each case there is a chairman in the rank of rear-admiral or the equivalent and members representing the three Services. A body called the Permanent Joint Board on Defence, which includes members representing both Canada and the United States, meets periodically to consider defence matters concerning the two countries. Canadian Service attachés are appointed to a number of diplomatic missions abroad.

Although training in general is a matter for each individual Service, certain instructional establishments accept candidates from all three Services. The National Defence College at Kingston is the equivalent of the Imperial Defence College and is conducted on the same lines. The course is attended by about thirty senior officers and civil servants; one or two representatives of industry are also invited to attend. For the training of cadets who are candidates for regular commissions Service Colleges are established at Esquimalt, British Columbia, at Kingston, Ontario, and at St. John, Quebec; all train cadets for the three Services.

OFFICER PRODUCTION

The principal source of regular officers for the three Services is the Regular Officer Training Plan, under which officer cadets are trained at public expense either at the Service Colleges or at a university and during the summer receive practical instruction with the Service of their choice. About ninety per cent of the cadets at the Service Colleges are training for regular commissions under this plan; the remainder are reserve cadets, who pay fees for their instruction and are not required to take regular commissions.

All Services grant short-service commissions as well as regular commissions. The terms of service for short-service commissioned officers vary somewhat between the Services, and training is carried out independently by each Service. Regular commissions may be granted to suitable short-service commissioned officers.

THE NATIONAL DEFENCE ACT

Until the passing of the National Defence Act in 1950 the Army and Air Force Acts of Great Britain were by Canadian statute made applicable to the Canadian Army and the Royal Canadian Air Force respectively, and until 1944 the Naval Discipline Act of 1866 (Great Britain) applied in a similar way to the Royal Canadian Navy; but the Naval Service Act of 1944 gave the Royal Canadian Navy its own purely Canadian code of discipline, and in 1950 the National Defence Act did the same thing for the three Services. The object of the Act was to produce as far as possible uniformity between the Services from a legal standpoint, and this object has been achieved; but, although all Services are now subject to purely Canadian Service law, Canadian law follows closely that of Great Britain, and in practice no very drastic changes are noticeable.

In accordance with the spirit of the National Defence Act which removed legal differences between the Services, the Judge Advocate-General is directly responsible to the Minister of National Defence for legal matters concerning the three Services; legal officers are drawn from all Services and are not necessarily employed with the Service to which they belong. At first it seemed strange to see an Air Force officer acting as judge advocate at a military court-martial or an army officer performing the same duty at a R.C.A.F. court, but it is amazing how quickly such things lose their novelty.

THE ROYAL CANADIAN NAVY

On August 7, 1950, under the National Defence Act, the Canadian Naval Service, regular and reserve, became the Royal Canadian Navy; previously the title Royal Canadian Navy had applied only to the regular Navy. The Act also stated that the Chief of the Naval Staff should, "subject to the regulations and under the direction of the Minister, be charged with the control and administration of the Royal Canadian Navy", making him in effect commander-in-chief. The Chief of the Naval Staff is advised by the Naval Board, composed of the Vice Chief of the Naval Staff, the Chief of Naval Personnel, the Chief of Technical Services, the Assistant Chief of the Naval Staff (Warfare), the Assistant Chief of the Naval Staff (Plans), and the Assistant Chief of the Naval Staff (Air). All ships of the R.C.N. are based on either Halifax, Nova Scotia, or Esquimalt, British Columbia, and the Flag Officer, Atlantic Coast, and the Flag Officer, Pacific Coast, respectively, are in command of all ships, training centres and other establishments, except reserve divisions, in these two areas.

The form that Canada's post-war navy was to take was announced at the beginning of 1947; it was to be much stronger than any naval force that Canada had previously maintained in peace time and was to include a light fleet aircraft carrier, two six-inch gun cruisers, seven "Tribal" class destroyers, two "Algonquin" class ("V" Class) and two "Crescent" class destroyers, and a number of frigates and smaller vessels. Since then an expansion has taken place and an extensive programme of construction, conversion and modernisation has been undertaken; H.M.C.S. Bonaventure, a carrier to replace H.M.C.S. Magnificent, which is on loan from the Royal Navy, is being built by Harland and Wolff, Belfast, a number of smaller vessels are under construction in Canadian yards, most of the seven "Tribal" class destroyers have been converted to destroyer escorts and the modernisation of the frigates is well advanced. The strength of the R.C.N. has increased from 11,082 early in 1951 to 16,377 at the end of 1953.

The importance of naval air power is recognised in the post-war Canadian Navy. H.M.C.S. Shearwater at Dartmouth, Nova Scotia, was commissioned at the end of 1948 as a shore base for all establishments of the Air Branch, and additional training facilities at Summerside, Prince Edward Island, have recently been obtained from the Royal Canadian Air Force. The "Sea Fury," which is the present fighter aircraft of the Royal Canadian Navy, is to be replaced by the jet-powered "Banshee," and the Grumman "Avenger" anti-submarine search and attack aircraft will be replaced by the Grumman S-2F.

The Royal Canadian Navy (Reserve) is organised in twenty-two divisions distributed throughout the country, each specialising in one phase of naval training; in addition there are three Naval Reserve Air Squadrons. The Commanding Officer Naval Divisions established at Hamilton, Ontario, is responsible for the administration and training of the R.C.N.(R.).

The operations of the three destroyers continuously maintained in Korean waters since 1950 have of course provided valuable training for the R.C.N. In addition Canadian ships have participated in N.A.T.O. exercises; the aircraft carrier Magnificent, the cruiser Ontario, the destroyer escort Algonquin, and the frigates La Hulloise and Swansea took part in exercise "Mariner" in September and October, 1953.

THE CANADIAN ARMY

Just as are the Chiefs of Staff of the other two Services in relation to their services, the Chief of the General Staff is, under the National Defence Act, charged with the control and administration of the Canadian Army. The Army Council is composed of the Vice Chief of the General Staff, the Adjutant-General and the Quartermaster-General; besides operating as a committee the members advise the Chief of the General Staff on matters affecting their own branches of the staff. Throughout the country, the Army is organised in five commands: Eastern Command, Quebec Command, Central Command, Prairie Command, and Western Command, each commanded by a major-general and including one or more areas.

As soon as the brigade groups for service in Korea under the United Nations and in Europe under the North Atlantic Treaty were sent abroad, a reinforcement group to train and despatch drafts of replacements was organised for each brigade group. These reinforcement groups, which resembled brigade groups in composition, have been reorganised to form and 2nd and 3rd Infantry Brigades, which, together with the 1st Infantry Brigade in Germany, form the infantry of the 1st Division. The formation of the divison was announced in October, 1953, and since then the organisation of the comparatively few divisional units not already in existence has been undertaken; apart from the division that was retained until the middle of 1946 for occupation duties in Germany, the new division is the first ever formed by the Canadian Army in time of peace.

Not included in the 1st Division is the Mobile Striking Force, an airborne force consisting of three battalions of infantry and small artillery, engineer, signal, army service corps and medical units. Its role is defence against airborne attack, and it works in close co-operation with the Royal Canadian Air Force. C-119 aircraft are used to transport the Mobile striking force, and exercises, frequently under severe arctic conditions, are carried out regularly.

The 25th Canadian Infantry Brigade has served in Korea since May, 1951, and since July of that year has been an integral part of the 1st Commonwealth Division; with the declaration of the Armistice in Korea no change in the status of the brigade was made. Service in the Far East is limited to approximately one year. Originally reliefs were carried out individually, but since the autumn of 1952 major units have been relieved complete, whether the individual members of a unit have completed a year's service in the Far East or not.

In common with the other Services, the Canadian Army has expanded rapidly in the last few years. From a strength of 21,473 in 1946, it had reached 34,986 in 1951 and 49,176 by the end of 1953.

Canada's size and severe climate create serious problems in training. Recent developments in cold-weather clothing have done much to overcome the difficulties of winter training, but moves of a thousand miles or more to concentrate for training can only be avoided by providing training areas in different parts of the country. A good, if rather remote, training area exists at Wainwright, Alberta, a very much smaller one at Petawawa on the Ottawa River, and the problem has finally been solved by the creation of an area suitable for all types of training at Gagetown between Saint John and Fredericton in New Brunswick. Specialist training and training of instructors is carried out at Corps Schools, of which there is one for each arm and service in the army. In addition there are the Northern Training Centre at Fort Churchill, Manitoba, on Hudson Bay, the Joint Air Training Centre at Rivers, Manitoba, and the Canadian Army Staff College at Kingston, Ontario. Tactical doctrine in the Canadian Army closely follows that of the British Army.

The two regular armoured regiments are equipped with Centurion tanks, but vehicles throughout the army, other than armoured vehicles, are of Canadian manufacture. Wireless equipment is of Canadian manufacture and largely of Canadian design, guns, mortars and rocket-launchers are of American design, and rifles, medium machine guns, Bren guns and submachine carbines are of British pattern; the FN rifle is undergoing tests and has been issued in limited quantities.

The Canadian Army Reserve Force, which corresponds to the Territorial Army in Great Britain, had at the end of 1953 a strength of 47,382. It is, and always has been, a very important element in the Canadian Army, although since the expansion of the regular force its relative importance is not as great as it was. A board of retired senior officers has recently examined the Reserve Force and has made certain recommendations to increase efficiency and to meet changing conditions.

THE ROYAL CANADIAN AIR FORCE

The Chief of the Air Staff is advised by the heads of the three staff branches: the Vice Chief of the Air Staff, the Air Member for Personnel and the Air Member for Technical Services. Unlike the other Services, the system of command in the Royal Canadian Air Force is organised functionally rather than geographically; there are six commands: Air Material Command, Air Defence Command, Air Transport Command, Training Command, Maritime Command and Tactical Air Command. Not included in the commands are two independent groups, Maritime Group and Tactical Air Group, the former at Halifax working in co-operation with the Royal Canadian Navy and the latter at Winnipeg working in co-operation with the Mobile Striking Force of the Army.

The air defence of Canada is inevitably closely linked with that of the United States and the system of radar stations and other arrangements for early warning are co-ordinated between the two countries. The programme of organising R.C.A.F. squadrons for air defence is well advanced, as is conversion of these squadrons to the CF-100 all-weather fighter, powered with the Canadian Orenda engine, with which all of these squadrons will ultimately be equipped.

The headquarters of the Canadian Air Division with the N.A.T.O. forces in Europe is established at Metz and three of the four wings are at Gros Tenquin, Zweibrücken and Soellingen; the fourth wing will ultimately be at Marville in France, but at present is at North Luffenham in England. The division is equipped with Sabre (F86) aircraft, which will be replaced by later types of the same aircraft as these become available.

The expansion to meet the N.A.T.O. commitment placed a heavy burden on the R.C.A.F. training installations, necessitating the opening of additional flying training schools and the expansion of facilities for the training of navigators and radio officers. The peak of this task has now been passed and the level of training is likely to remain generally constant for some time. Training facilities have been made available to air crew of N.A.T.O. countries and this programme has been very successful and will be continued. The R.C.A.F. Staff College is in Toronto, Ontario. In strength the R.C.A.F. has expanded even more rapidly than the other Services; from a strength of 22,359 in 1951 it increased to 43,352 at the end of 1953.

Units of the R.C.A.F. Auxiliary are distributed throughout the country; auxiliary fighter and light bomber squadrons form part of the air defence organisation. As well as air crew training, considerable emphasis is laid on ground crew and technical training. At the end of 1953 the strength of the R.C.A.F. Auxiliary was 5,643.

THE DEFENCE RESEARCH BOARD

The Defence Research Board was authorised in 1947. It consists of twelve members, six ex-officio and six appointed. There is a permanent chairman, who is one of the six ex-officio members, the others being the three chiefs of staff, the President of the National Research Council, and the Deputy Minister of National Defence; the appointed members are scientists of recognised standing. The purpose of the Board has been stated to be "to correlate the special scientific requirements of the Armed Forces with the general research activities of the scientific community at large". As far as possible use is made of existing scientific facilities such as the National Research Council; but, by reason of the special nature of the research for the armed forces, this cannot always be done, and it is necessary for the Board to maintain a limited number of laboratories and experimental stations of its own.

There is a permanent headquarters of the Defence Research Board, the main purpose of which is to co-ordinate the work of the Board's own establishments and to establish liaison with those scientific agencies not controlled by the Board but associated with it. The Board maintains close touch with the corresponding bodies in Great Britain and the United States; by exchanging information, duplication is avoided and it is possible to some extent at least for each country to concentrate on the subjects for which it has the best facilities. The Canadian Defence Research Board has particularly concentrated on the problem of operations in the north.

THE FUTURE OF CANADA'S DEFENCE FORCES

Traditionally Canada's reserve and auxiliary forces have been regarded as her first line of defence. They have been the foundation on which the national war effort must be built. The regular forces were merely a nucleus for the training of the reserve forces and to provide qualified men to fill key appointments. This conception was based on the assumption that Canada would not be the object of direct attacks, and that, should Canada become involved in war, it would most probably be in Europe, and the forces in being of Canada's allies would, as in the past, hold the enemy at bay until Canada's national forces could join those of her allies and achieve victory. The situation has changed.

It must now be recognised that Canada could be the object of at least limited direct attack, but, even more important, the burden of maintaining adequate forces in being has become so heavy that the great powers can no longer support it alone; all peace-loving nations must be prepared to bear their share of the load. In consequence, Canada's regular forces have had to be expanded from a nucleus of well-qualified instructors to forces in being capable of resisting a limited direct attack on Canada and of instantly joining her allies in holding the enemy until the national forces of Canada and her allies could be mobilised.

Canada's defence forces are no longer a small group of specialists of which the public knew little and thought less. They now represent the greatest item of national expenditure, and are a big employer of man-power and a generally known and accepted feature of national life. The regulars, not the reserves, are the first line of defence; but, although the regulars have become more important, the reserves have not become less so and they remain the foundation of the national war effort. It is impossible to foresee accurately the nature of future war, but there is little doubt that, in any major war of the future, the participation of North America will no longer be a matter of choice. Canada must now maintain defence forces in being just as the countries of Europe have always had to do.

M. P. BOGERT

Ottawa, Canada.
April, 1954.

CHAPTER XVII

THE UNITED STATES AND THE "NEW LOOK"

By Major the Hon. Alastair Buchan

Between the middle of 1953 and the spring of 1954, no major decision was taken by the United States Administration under President Eisenhower which altered the concept of American strategy which was evolved between 1947, the year in which it was decided that the United States was permanently committed to the defence of western Europe, and 1950, the year of the outbreak of the Korean war. However, during this time the free world underwent several periods of intense discomfiture because it appeared that some major change in American policy was impending that would involve the reduction of American commitments abroad, or would increase the danger of a third world war. It is ironic that under the first soldier-President in some eighty years almost all the statements on service and strategic policy whose conflict was the source of this confusion, were made by civilian members of the Administration and not by the service chiefs.

The Eisenhower Administration had been in office for only a few months when it became clear that it would ratify one important change in method which had been becoming more urgent in the two preceding years. This was to abandon the concept of a "critical year" as the date by which both American and N.A.T.O. rearmament must reach its peak, in favour of a long-term programme which could be sustained indefinitely if necessary without undermining the economic foundation of the N.A.T.O. powers. The original "critical year" had been 1954 when it was thought that Russian military strength would reach its peak, but because of production problems it had been tacitly postponed until 1955. In April, 1953 Mr. John Foster Dulles at the N.A.T.O. meeting in Paris, and President Eisenhower in a speech in Washington explicitly made it clear that henceforth the philosophy of the "long haul" would prevail.

It was this concept, which had originated with the British Government the previous year and which had been pressed on the United States at successive N.A.T.O. meetings, that was originally characterised as the "New Look." It had been resisted by the Chiefs of Staff in the last year of the Truman Administration, on the grounds that unless the United States set a continuously good example to its allies and so could exert pressure on them to continue their rearmament at the greatest possible speed, there would be a general slackening of effort throughout N.A.T.O. whose forces were still far below requirements. It was accepted by the Eisenhower Administration—it should be noted before the new Chiefs of Staff came to office last summer—partly on military and partly on political considerations. The military consideration was that the growing stock of nuclear weapons, in all three Services, made urgently necessary a review of the whole basis of American military planning, and that to build a vast stockpile of conventional armaments at this stage might be a costly and disastrous mistake. The political consideration was that the

Republicans had been returned to office in November, 1952, to reduce government expenditure and taxation, and were therefore under the greatest pressure to "stretch out" or limit defence expenditures which account for some three-fifths of the Federal budget. For this reason they asked for $36,500m. for the fiscal year July 1, 1953, to June 30, 1954, a reduction of some $5,000m. on Mr. Truman's request. Congress actually voted $34,371m.

It appeared that the major economy would be a reduction in the size of the Air Force from the original figure of 143 wings by 1957 to 120 wings, with a reduction in Air Force and an increase in Army expenditure. This was a decision taken by Mr. Charles Wilson, the Secretary of Defence, and the Deputy Secretary, Mr. Roger Kyes. But in mid-August the new Joint Chiefs of Staff took office. Admiral Arthur Radford succeeded General Omar Bradley as Chairman, General Matthew B. Ridgway became Chief of Staff of the Army, Admiral Robert B. Carney became Chief of Naval Operations, and General Nathaniel F. Twining had become Chief of Staff of the Air Force. When they took office President Eisenhower directed them to undertake in the context of the "long haul" policy, a searching re-examination of American strategic and defence policy, that would take account of the fact that the United States must be prepared not only for total war, but for limited military actions, such as Korea, as well.

From this emerged a reversal of the earlier decision, which had been made of course before the final conclusion of an armistice in Korea. It was decided that the level of military expenditure which the United States could support indefinitely was about $30,000m. a year, and that a reduction of the military budget to this figure would be achieved by building up the Air Force to a figure only slightly below that of the Truman Administration—137 wings by 1957 instead of 143—while progressively reducing the organised strength of the Army from 20 to 17 divisions and then probably to 15. In other words the long-term strategy of the United States returned to what it had been before the Korean war, to a primary dependence on air power using atomic weapons, rather than mobilised ground strength, although the new balance was struck on a far larger scale of expenditure and military strength than that which prevailed between 1946 and 1950, as President Eisenhower said in his 1954 Budget message.

The reasons behind this decision have never been fully made public but are probably as follows: the increasing abundance of atomic weapons, including the hydrogen bomb, gives American air power a flexibility and destructive power which will provide the principal deterrent to a world war: with the end of the Korean war the need for ground forces was diminished: moreover the United States is facing a growing shortage of young manpower as it has to draw on the children of the years of low birthrate in the 1930s; the United States must exploit its principal source of strength which is technical and productive skill rather than be drawn into the trap of attempting to compete with Russia and China where they are strongest, namely in man-power.

However, and despite the disclaimer of all concerned, it is hard to believe that political considerations—perfectly valid ones—did not play a certain part. An annual defence budget of $30,000m. is not the maximum defence expenditure the American economy can maintain—an independent group of economists has recently put the figure at $70,000m. —but it is probably the maximum that any administration, Republican or Democratic, can get the taxpayer to accept over the years. Again there is an instinctive dislike of a large standing army in the United States as in Britain and a distaste for the discomfort and rigour involved in service abroad in the army; this was one of the reasons why General Eisenhower's promise to end the Korean war played such an important part in his election to the Presidency in 1952.

President Eisenhower in his State of the Union message to Congress on January 7, 1954, made it clear that he had accepted this change in emphasis as his own policy. "While determined," he said, "to use atomic power for peace we take into full account our great and growing number of nuclear weapons and the most effective means of using them against an aggressor if needed to preserve our freedom." He pointed out that the use of atomic weapons permits "economies in the use of men." "Our armed forces must regain maximum mobility. Our strategic reserves must be centrally placed and readily deployable to meet sudden aggression against ourselves and our allies." In conformity with the new policy the budget which was submitted for the year 1954–55, the year of the so-called "interim look" asked for $30,900m. in new authority, a further reduction from last year. This was achieved by reducing the Army's request by $4,785m. from last year to $8,211m. while the other two services remained unchanged. On present indications it is likely that Congress will pass the budget at a figure of about $30,000m.

The change of emphasis was even more marked in terms of current expenditure envisaged during 1954/55. Out of a total contemplated expenditure of $37,575m. (as opposed to $41,550m. in the previous fiscal year) the Air Force was to receive $16,300m. as against $10,200m. for the Army (a reduction of $4,000m. over the previous year, most of it in procurement and production of equipment). The largest cut in manpower was to be taken by the Army.

There would probably have been less criticism and anxiety, both in the Press and in Congress, about the Administration's new emphasis on airpower at the expense of ground forces, had the motives for the decision been more candidly explained, and if Republican spokesmen had not tended to put forward what was essentially a compromise between political, economic and strategic considerations as a brilliant new panacea for the national security.

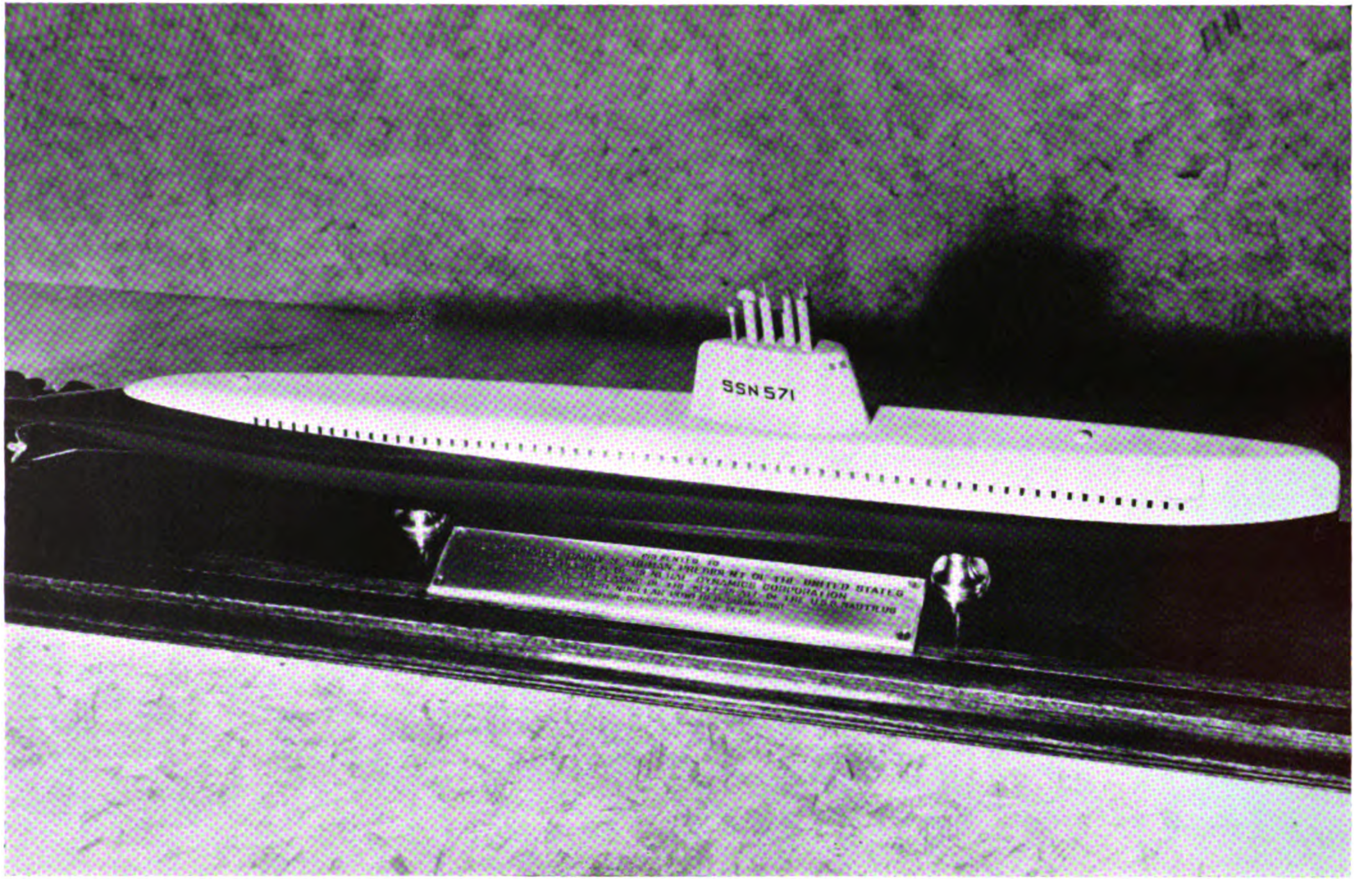
The desire of the Administration to prove in countless speeches that it possessed an "initiative," as a result of its new defence policy, which had been decided to its predecessor, might have been taken by the allied and American opinion alike, as the normal practice of political "gamesmanship" until Mr. Dulles's speech to the Council of Foreign Relations in New York on January 12, 1954. In this he criticised the previous policy that had involved the commitment of large American ground forces in Asia, that involved large amounts of military aid to America's allies, and "military expenditures so large that they lead to 'practical bankruptcy'." The Eisenhower Administration, he continued, had sought more effective and less costly security arrangements "by placing more reliance on deterrent power and less dependence on local defensive power" while reinforcing local defences "with the further deterrent of massive retaliatory power." Since this speech was clearly made in the context of the steadily improving military position of the Communist Vietminh forces in Indo-China, the natural deduction was that the United States was prepared to bomb Peking or Moscow if Russia or China could be shown to be openly supporting Vietminh, with the horrendous prospect of total war that this opened up. Although Mr. Dulles explained later that he had referred to the American "capacity" for massive retaliation rather than the actual use of it, the alarm which his statement caused was reflected not only in allied governments, but in American opinion which since the news of the Russian explosion of a hydrogen bomb in 1953 has become increasingly conscious that retaliation is a two-way street. This was reinforced by the public debate that took place during the summer of 1953, from which it emerged that the expenditure of even a titanic sum of money, say $17m. or $19m. in the next two years, on early warning and A.A. defence would give the vast, thickly populated areas of the United States only partial protection.

As the Indo-Chinese crisis deepened throughout the spring of 1954, growing doubts began to be expressed in Washington as to whether the Administration's new policy really fitted the facts. Although there were signs that the Russians were responsive to the threat of "massive retaliation" there were no signs that the Communist Chinese were. The fall of Dien Bien Phu in early May seemed to many observers to signalise the calling of Mr. Dulles's bluff. Just as his decision on a collective defence pact for South-east Asia to which the United States would give definite commitments—whether these included land forces was not clear at the time of writing—signalised his recognition of the fact that the integrity of that area could not be guaranteed by the threat of retaliatory action by the United States Air Force alone. At the same time the ability of the United States to intervene with ground forces in Indo-China had been seriously limited by the withdrawal and demobilisation of two of the seven American divisions in Korea. In fact it became plain during May of this year that the United States Army could not send ground forces to Indo-China without at least a partial remobilisation or reactivation of its reserves which would make unmistakable demands on civilian man-power, and would require a profound moral decision on the part of a nation to which intervention on the side of a colonial power would be deeply distasteful

But the situation in Indo-China, though far the most serious confronting the west, was not the only one where words from Washington occasioned confusion and alarm amid the allies. Mr. Dulles's initial call for "united action" over Indo-China at the end of March, 1954, fell on deaf or worried ears because it had been preceded by talk of "massive retaliation" and coincided with the series of hydrogen bomb explosions in the Pacific which revealed the awful scope of retaliation. Similarly, when Mr. Dulles told the North Atlantic Council on December 14, 1953, that a failure to establish "political, economic and military unity" in Western Europe would "compel an agonising reappraisal of basic U.S. policy" he raised a host of fears because of various hints that preceded this remark. Throughout the autumn the increased emphasis on American air power at the expense of ground forces was becoming evident: in September the bilateral American negotiation for air and naval bases in Spain was concluded after two years of negotiations; the American effort to build bases in North Africa was being redoubled; and negotiations later concluded for a military agreement with Pakistan were in the offing. In addition the process of re-thinking American strategic policy had produced a tentative query—for it was little more—as to whether it really made sense to maintain five American divisions and a large ancillary force in Europe when it cost $350m. to support an American division in these countries as against $80m. for a French or British and $30m. for a Turkish division, and whether the same amount of dollars might not produce greater strength in terms of local ground troops while the United States concentrated on air and atomic units. At the same time Senator Bricker was trying to get an amendment through the Senate which would limit the President's powers to enter into new treaty obligations. At no time was it suggested by any responsible person that the United States would decrease its commitments to Britain and Western Europe in the event of war. But the juxtaposition of all these subsidiary factors gave to Mr. Dulles's threat a potency which it did not intrinsically possess.

It is true that in Washington as in London there has been considerable thought given to what alternative policy can be pursued if after three years of negotiation the European Defence Community eventually proves stillborn. But despite what has been said by America's civilian spokesmen, many of them business men whose sense of values is tied to cost accounting, there is no thought among military leaders in Washington of abandoning Western Europe for the kind of "peripheral strategy" which the pressure for air and other bases outside it might suggest. It is frequently said that the Pentagon is in favour of German rearmament at any cost, and it is true that the Chiefs of Staff—new and old—have been insistent on the absolute necessity of creating a German force of at least 12 divisions. But it is often overlooked by alarmists that the Pentagon now has a military investment in France and the Low Countries in the form of pipe lines, airfields, port installations and supply routes which it could forego only at the loss of hundreds of millions of dollars and years of effort. It is the American soldiers and airmen themselves who have the biggest stake vested in E.D.C., far more immediate than the vaguer—though totally sincere—interest of President Eisenhower and Mr. Dulles, in European political, economic, and military integration. The fact that intelligent people in Britain and Europe could be seriously exercised about whether the United States might adopt a "peripheral strategy" testifies to the confusion about American long-term strategic policy which the tendency to boast about changes of emphasis, rather than to underline the inescapable continuity of policy, tends to produce.

When all this has been said, it should be noted that the continued interest in European defence and economic vitality which President Eisenhower and Mr. Dulles have evinced does represent something of the triumph of intellect over prejudice, for it is an observable fact of American history that Democratic Administrations lean towards Europe and Republican Administrations towards Asia. The reasons for this go deep into American political history, the dependence of the Democrats on the votes of the Anglophile and Francophile eastern and southern parts of the country, and of the poorer immigrants, originally Irish, later



(*Courtesy of the U.S.A. Navy Department*)

Model of the first atomic-powered submarine, U.S.S. Nautilus

Scandinavian, German, Polish, and most important, Italian, whose eyes travel naturally to their homelands; the Republican basis is the agricultural midwest with its missionary interest in China, its detachment from Europe, and in the Far West to whom the Far East is the near west. The fact that President Eisenhower has so consistently emphasised the importance of N.A.T.O. and the European alliance represents a transcendence of the natural preoccupation of his party with developments in the Pacific

The number of controversies about American strategic policy in the past year have obscured more interesting developments that are taking place within the Services themselves. One effect of the Republicans' "new look" has been to change the balance of power in American Service politics. The great battles of five to three years ago were between the Air Force and the Navy, between the carriers and the heavy bombers, a battle substantially won by the Air Force. Today there is a more restrained but nevertheless sincere controversy between the Army and the other two services, consequent on the Joint Chiefs' decision of last autumn. The crux of the argument is that the political leaders have been dishonest in suggesting that atomic weapons can lead to an economy in manpower, that the nuclear battle requires more, not less men than the conventional battle since it necessitates a much higher degree of decentralisation, and that few or cheaper misapprehensions have been foisted on to the taxpayer than the slogan "a bigger bang for a buck." Coupled with this is profound disquiet among professional officers of all services at political reliance on "massive retaliation" as an instrument of policy, since it is felt that to use this instrument requires a catastrophic political judgment from which most political leaders will, in the last resort, withhold decision, leaving the field up to the despised and politically unattractive ground forces whose strength has in the meanwhile been attenuated in the interests of the dazzling but eventually unusable air forces.

Nevertheless, the United States Army has made some profoundly interesting tactical experiments in relation to the use of atomic weapons, which as Admiral Radford said last December "have virtually achieved conventional status with our armed forces. Each service is capable of putting this weapon into combat use." As a result of exercises held in Germany and in the United States, based on the use of all types of atomic weapons, an interesting new concept of army organisation is evolving. The division which since its inception by Napoleon has been regarded as the basic higher formation may be going the way of Napoleon's *Grande Armeé*. The advanced school of thought in the U.S. Army envisages a much smaller formation on a more mobile basis—perhaps 2,000 men or less. A formation still called a division, and able to deliver the firepower of an old division without the administrative vulnerability, may emerge resembling the present brigade group including armour (with new lighter tanks than any in present service). A brigade would shrink to the size it was in the Crimea—to 500 men, or a "division" might be composed of three battalions, one of them armoured. The atomic battlefield will be a lonely and a mobile one, with an even smaller density of troops than the Western Desert. Corps headquarters might command six or more of such "divisions" compared to the present conventional two or three. There are two schools of thought about the supply and ancillary services of such formations. Either they should carry a complete cross-section of supply and maintenance services, or all these services will be supplied by corps or Army, probably by airborne means, in a fashion not dissimilar to that of the German Panzer Divisions in their heyday.

As Major-General James Gavin, now Assistant Chief of Staff for Operations, and once the famous commander of the 82nd Airborne Division (of whom General Dempsey, the Commander of the British Second Army said at Arnhem: "I am proud to meet the commander of the greatest division in the world today") wrote in the April issue of *Harper's Magazine*: "If atomic weapons are used at all, they will sooner or later be used directly against land forces; and the only countermeasure possible is to reduce drastically the numbers of soldiers per square mile in the battle area, which will itself have to be regarded as a zone hundreds of miles deeper than it is at present. Since fewer soldiers will have to cover much more ground, there will be a proportionately greater need for atomic weapons and for a more rapid and efficient supply system to provide them with ammunition. In the solution of these problems the air vehicle will inevitably play a major part." The U.S. Army has fought a steady rearguard action against the reduction in strength and organisation that the Republican "New Look" has necessitated, but they have done it with greater dignity than the Navy's similar action of four to five years ago. What is coming up for decision is whether the Army can maintain even its existing reduced commitments of 17 instead of 20 divisions on the basis of the reduction from 1,445,000 men to 1,173,000 men which is the figure set for mid-1955.

The reduction in front-line strength which seems inescapable within the "new look" has led to much greater emphasis on the quality of both the National Guard—organised in 27 divisions of varying strength and quality—(the equivalent of the British Territorial Army) and of the Ready Reserve. In May, 1954, the obvious weakness of the United States in ground strength led to the publication of a report by a high-level Commission urging a more stringent organisation of the Reserves, which was sent to the President for consideration. Though it was clear that Congress could not digest any plan calling for more drastic use of manpower—reserve or active—before 1955 it was also clear that the military felt that such a drastic confrontation of the facts was overdue. The organisation of the new weight accorded to air power as publicised by the civilians in the Administration in the form of "more strength for less money" or "a bigger bang for a buck" has been a source of considerable unhappiness to senior officers, whether airborne, landborne, seaborne or chairborne.

This general sense of criticism was not decreased by the fact that, despite President Eisenhower's and Mr. Dulles's frequent references to the creation of a "strategic" or "mobile" reserve as one of the principal advantages of a policy of "disengagement," that reserve simply does not seem to be forthcoming. The original concept implicit in the formulation of the "new look" of a centralised "fire brigade" that would take off at a moment's notice has become overlaid by the demands of economy. The two divisions called home from Korea at the beginning of 1954 were demobilised, not added to the mobile reserve, and the irony is that since they were principally composed of drafters whose time was about to expire they have hardly decreased the strength, and costs of personnel, of the U.S. forces in the Far East. At the same time the 82nd Airborne Division remains the only instantly mobile force in the United States. There are no signs of action to create other airborne or air transportable formations: the 101 airborne of famous memory is still split into small components. Moreover, under the "new look" of 137 Air Wings instead of 143, almost the entire cut is in Troop Carrier Wings.

Much of what I have written inevitably sounds critical, but I should like to conclude by recording my own personal belief that the years 1953/1954 were bound to be years of doubt and debate because for the first time the potentialities and problems of atomic and nuclear weapons began in reality to obtrude themselves upon the consciousness of the professional serving officer and of the interested citizen. Their potentialities have presented an opportunity for the politicians which they have proved unable to resist, both in alluding to the ways in which they could save the citizen from military duty and in exaggerating their power to deter the Communists or to strengthen the West.

In conclusion, it is fair to say that the interrelation in the United States —which is largely accidental in point of time—between a colossal stride forward in the development of atomic weapons, and a political desire to lower taxation and expenditure has led straight to a moral problem which neither the leaders nor the voters have begun to resolve. As Mr. Walter Millis, one of the best and most objective of American military analysts, wrote recently in the *Combat Forces Journal*: "We have to use our threat of nuclear, population bombing to prevent war if we can, but to introduce these weapons into our conventional strategy in such a way as virtually to force any war that does break out into a pattern of general strategic destruction seems at the very least a dubious course."

ALASTAIR BUCHAN

CHAPTER XVIII

AIR SUPPORT FOR THE ARMY

By Major-General R. H. Bower

The summer of 1945, in which the war in Europe came to an end and the first atom bomb was dropped on Japan, initiated a new era in land/air warfare. Jet fighters were flying, jet bombers were on the drawing board, and the atomic age had begun.

In the Air Forces of the Western Nations these developments affected in the main the fighter and bomber squadrons and the weapons and ancillary scientific aids upon which their operational efficiency increasingly depends. Although new offensive and defensive techniques are being evolved to match new equipment it would appear that, at any rate in the operational theatre of the land battle, no means has yet been found to ensure a complete defence against the atom bomber. The stakes for which opposing air forces will be playing in a future war have thus been considerably raised, and the obvious need to achieve the greatest degree of air superiority obtainable early in a future war has resulted in strenuous efforts to take advantage of all forms of technical progress. One result of this evolutionary process is that the cost of producing the latest types of jet aircraft has vastly increased, and the matching of these machines with suitable navigational aids, with air fields of suitable strength and size, and the provision of adequate refuelling systems have enhanced costs still further.

These factors have produced changes in methods to be employed in the conduct of the land/air battle. So far as the Army is concerned, the importance of anti-aircraft defence has been increased and the need for dispersal and concealment has been emphasised. In the case of the Royal Air Force, the vast increase in costs can only result in it being strictly limited in size, and within it, the Tactical Air Force also. The need to win the air battle early, and the enduring threat of the atomic bomb whether this battle has been won or not, combined with the relatively small size of the Tactical Air Force makes it clear that the Army cannot expect the lavish offensive support to which it grew accustomed in 1944/45. It must therefore be quite clear as to its requirements and their relative priorities.

Unfortunately the armies of the Western Nations also tend towards an ever greater complexity and cost. By means of an increasing fire power, and by the use of armour and mechanisation, they seek to keep casualties to a minimum and to ameliorate the lot of the battle-fighting troops in every way possible. The penalty lies in the size, vulnerability and cost of the administrative Services, and therefore also in the limited number of fighting formations which can be sustained. Thus the armies of the Western Nations are not only more susceptible and vulnerable to air attack than are those of the Eastern bloc, but they are also comparatively weaker in man-power and in the number of their fighting formations.

It might well have been thought that the Korean war would show the way in which modern air power would be likely to affect a future war, should it occur in Western Europe. But in this respect at least, the Korean Campaign was a failure. Almost from the start, the United Nations possessed air superiority, and latterly, a virtual air mastery. The Communist land forces, however, did not sustain the crushing and decisive defeat which might have been expected to follow such a situation. Indeed, they were able to launch considerable offensives in spite of an inferiority in the air. The reasons are fairly clear. In the first place, the Communist man-power was able to accept and replace the heavy casualties which were inflicted on it from the air. Because of this, and because they were content with low standards of existence, their administrative organisation was far less vulnerable than would be that of a United Nations army of similar size. Most of the Communist troops were countrymen, well able to look after themselves under severe conditions of hardship, and they rapidly became masters at concealing themselves and their equipment. Finally, and probably most important of all, for political reasons the air war was strictly limited in scope and no atom bombs were dropped by the air forces of either side.

Although, therefore, the shape of a future war in Western Europe cannot be deduced from the recent Far Eastern venture, there are certain matters in the conduct of future land/air battles which can be stated with some degree of certainty. If, in 1940 and 1941, the Allied Armies found that enemy air power contributed directly to their defeat, and if in the late summer of 1942 Rommel found his opponent's Air Force a crippling, and in the summer of 1944 the decisive factor in his conduct of the land battle, surely any nation or group of nations that concedes air superiority to an enemy possessed of atom bombs will be in even greater difficulties. For in a war between the armies of highly developed countries, whose administrative installations and transport are particularly vulnerable to air attack, unless it is possible at least to achieve a local and perhaps only temporary air superiority, administrative output may be seriously reduced and the mobility of reserve formations may suffer to such an extent that defeat in detail becomes possible. It is therefore clear that the first requirement which a modern army has of its supporting air forces is that the enemy air potential shall be reduced to a minimum at the earliest possible moment, and thereafter kept in subjection. This is an ideal which it will be difficult to achieve due to factors already mentioned. But at least the Army is clear as to its requirement, and from the point of view of the Royal Air Force, it would probably be desirable for the Army to state this single requirement and to leave it at that.

But unfortunately, it is possible that even after some degree of air superiority has been achieved, the armies of the United Nations might be unable to hold, and still less to defeat an enemy onslaught on land without the direct assistance of air power. If such air superiority cannot be achieved quickly, then it is evident that it will be correspondingly more difficult to find sufficient resources with which to give air support to the land battle. Nevertheless, some support there must be, and it is just as well to state at the outset that this type of support is not required to consist, as is sometimes supposed, solely or even primarily of low flying attack. What an army needs most is information, and it needs it particularly badly when on the defensive.

In addition to the over-riding need for attaining air superiority as early as possible, air reconnaissance both strategical and tactical, photographic and visual, is the army's most important requirement. Given a favourable air situation, reconnaissance presents few difficulties other than those imposed by the weather: but the more critical the situation, both in the air and on the ground, the greater will the need for information become. To be sure of obtaining this it may be necessary for day reconnaissance aircraft to be escorted, and night reconnaissance, though more limited in potential, will be an essential element in the deduction of the enemy's aim. Night reconnaissance can however only succeed in suitable weather conditions and when backed by efficient navigational aids and photographic equipment, but it will be of particular value in theatres where good weather is the rule rather than the exception. To obtain information may prove expensive in aircraft, but so will bombing raids. To forego one or two bombing sorties will not lose a campaign ; lack of information could well do so.

In a condition of air inferiority or even air parity, continuous offensive air support on a large scale within the area of the tactical battle cannot reasonably be expected by the Army. But there will certainly be vital occasions when enemy concentrations of any or all arms have been found by air reconnaissance or by other means, and when the threat is such that they must be attacked whilst still out of range of our own artillery. The degree of urgency and the scale of air attack required will vary with the target, perhaps from that of a relatively small though important concentration of enemy armour, to one of all arms threatening a large scale and possibly decisive disruption of our defence forces in the theatre. The requirement in terms of air power may therefore also vary between the despatch of a formation of fighter-bombers from a Tactical Air Force, and an atom bomb concentration delivered by any or all of the United Nations air forces.

To achieve this, machinery must exist to make the required air support available quickly and certainly, even though the decision to release the necessary air power has to be taken at a very high level. It is desirable, and particularly so in the very early stages of a war, that both strategical and tactical air power shall be made available for attack against targets which, if not attacked, might have a direct and adverse effect on the land/air battle itself.

The extent to which the atom bomb can contribute towards the isolation of the battle-field and the denial to the enemy of his means of supply and reinforcement is as yet uncertain. But it is reasonable to hope and to expect that even in a condition of air inferiority a worth while contribution towards meeting this important Army requirement should be possible without a great expenditure of air power.

It will be expected that as the air offensive succeeds in reducing the enemy potential, an ever increasing scale of offensive support will be made available for ground forces. The requirement then will be to continue to isolate the enemy and reduce his tactical mobility by attacking his road and rail services within the theatre of operations, to deny him air reconnaissance, and finally to supplement fire plans by delivering air attacks on targets which cannot adequately be neutralised by artillery alone. There will then also be the need for artillery reconnaissance and spotting for medium and heavier guns which cannot reasonably be carried out by light aircraft.

So far the development of the fighter/bomber has not reduced its power to intervene in the land battle in either the reconnaissance or the ground-attack role. It has however changed the method of employment in two important respects. First, the aircraft themselves, to say nothing of the pilots, are so expensive and therefore so limited in numbers that they must not be risked in ground attack on unimportant targets. To exchange a Hawker Hunter and its pilot for even several 3-ton lorries and their drivers would not usually be good business. And secondly jet aircraft operate inefficiently in respect of fuel consumption at low altitudes which means that they cannot be kept in the air waiting to be given a target. This is really a matter of good staff work and should not be of any great operational significance.

These then are some of the needs of the Army which it is hoped will be met by the United Nations Air Forces in support of the land battle, and as the air battle develops in our favour it should be progressively easier to meet them. But however the air battle may develop the Army's broad priorities for offensive support are not likely to change materially.

It is evident that until a high degree of security from attack by enemy fighters can be assured transport aircraft will not be able to operate in any numbers within enemy fighter range, and therefore within or near the area of the Tactical Battle. This does not however prevent transport aircraft being used for inter-theatre movement, and there is no doubt that if suitable types of aircraft are available, a very real saving in shipping and administrative overheads can be achieved.

Certainly there is a strong case for the strategic reserve of the British Army at all times being so equipped that it can be moved by air with its guns and transport, for the smaller the size of the reserve, the more important does its mobility become. Reinforcements which arrive by air without transport or equipment can be an embarrassment, as Rommel found to his cost during the retreat after Alamein. In the case of the German army during the war, and the British Army right up to the present day, only men and light equipment can be moved by air in operational quantities. The view has always been that it is most uneconomical to move transport and heavy equipment by air and that it should be pre-stocked in or near the place where it may be necessary to employ the strategic reserve. From the theoretical and technical movement point of view this is justifiable. But the Army is presented with a storage problem of some magnitude and this attractive theory also presupposes that it is known in advance where the strategic reserve may have to be employed, so that advanced bases can be permanently established within range. Even if this is possible it is likely that an airborne or air-transported move would be required, on grounds of speed alone, to reach the threatened spot in time. Given the proper type of aircraft there is no reason at all why a very considerable force should not be moved with its guns and vehicles at assault scales. The general method of employment would be to drop an airborne force to seize and hold an airfield of a type good enough to permit further air-transported forces to be landed. Both the airborne and the air-transported forces would be similarly equipped.

Within a theatre of operations the army will require aircraft for administrative purposes where ground communications are inadequate, when for any reason quick deliveries are necessary, or when by using aircraft existing administrative overheads can be reduced. In normal circumstances it would be extravagant to use air transport in a theatre in any considerable quantity in addition to, rather than instead of, normal ground communications. The administrative overheads of an air-transport organisation tend to be large, and these, if added to those already needed in the communications zone and in formations, will make even more disproportionate the ratio between fighting formations and the Services which sustain them.

As soon as it is considered that the air situation is satisfactory it should be possible to save both time and casualties by using airborne forces in an offensive role or as mobile reserves. Criticism of the way in which they have been used became apparent during and after the last war. Some of this may have been justified but it would be wrong therefore to conclude that Airborne Forces were just an expensive luxury. Deliberately to throw away such a potential of surprise and of strategical and tactical mobility would be a reactionary step by no means in line with the requirements of modern armies. Indeed it may well be that modern conditions tend to enhance the value of Airborne Forces. For in addition to the well known and variable types of operation for which these formations are suited, atomic warfare may make them especially useful. If, for example, due to a shortage of fighting formations and to the threat of atomic attack, United Nations armies are going to have to fight on very extended frontages and be dispersed in great depth, Airborne Forces could become the best type of mobile reserve for use within a theatre.

It is therefore evident that the transport component of the Royal Air Force must be something more than a service version of a civil airline equipped with passenger-carrying aircraft of civilian type, for they are of little value to the army for airborne or air-transported operations, and are also inefficient as freighters.

Civil aircraft are tending to develop further and further away from the military requirement and are rapidly becoming one-purpose aircraft. Being jets or turbo-props, they are pressurised and therefore have small side doors and are difficult to load and unload. Due to these and other factors they could not drop parachutists, still less equipment. They have relatively weak floors, a high landing speed, need long and good runways, and would therefore be unable to operate in many areas where they might be required.

For pure passenger carrying or trooping, high-performance civilian aircraft of the kind now operated by the Corporations and some charter companies are ideal, and as this is purely a civil function they should be employed for this purpose both in peace and war. But for airborne and air-transported operations and for air freight where heavy loads are required to be carried and landing grounds are uncertain, an aircraft of suitable design is a first essential. The Army must not be presented with a fleet of aircraft of civilian passenger-carrying type and be told that they must make the best use of them that they can. For this at once condemns an airborne force to fight its battles without any transport or artillery, and therefore renders it virtually impotent against anything much more formidable than a mob of savages. On grounds of expense and operational vulnerability gliders can no longer be used. It has therefore become necessary to drop equipment and vehicles by parachute, and for this purpose tail loading aircraft are essential. Luckily this type of aircraft is also the most efficient form of freighter so that the two requirements can be met by the same aircraft. Loads can be easily embarked and quickly off-loaded either by extractor parachute in the air, or by more conventional means on the ground. It is therefore in the Transport Groups of all United Nations Air Forces that the specialised transport types for use in a more militant capacity should be found, backed up if necessary by any civilian air freight companies that can be persuaded or subsidised into using aircraft of similar design.

There is however no doubt that demands for transport aircraft will always greatly exceed the available lift and so the Army must limit its demands to essentials. When airborne or air-transported operations are to be carried out, transport aircraft must not be locked up for a day longer than is essential either before or after the operation. When transport aircraft are needed for administrative tasks of long duration, then ground installations must be reduced to offset the overheads of the Army air-transport organisation. For its part, the Royal Air Force should provide aircraft of suitable types to meet the Army's needs and should train air crews so that their aircraft can be switched at the shortest notice from normal freighting tasks to the more militant role of airborne operations, and when aircraft are needed for administrative purposes there must be a reasonable guarantee of an adequate and continuing lift.

With the modern tendency towards greater dispersion and mobility of land forces, the Army is feeling increasingly the need to own, control, and operate its own light aircraft. These aircraft are regarded by the Army as flying jeeps or flying observation posts, and they must be as readily available for use as should be their four-wheeled counterparts. Hitherto both Air O.P. and Light Liaison Flights have been described as Royal Air Force units although the pilots are all soldiers and the ground staffs a mixture of soldiers and airmen. Training and maintenance have been R.A.F. responsibilities and on the whole this system has suited both Services fairly well.

Flying control and training has for good reasons always been a matter for the Royal Air Force and it is probable that it will continue to be so.

As in the near future the development of the cheap helicopter is likely to open new possibilities for many purposes for commanders, staffs, and artillery observers, the Army will want to vary its organisation and the numbers and types of aircraft at will, without having to go through the long process of interservice bids for men and money. It will only be possible to keep abreast of technical developments and maintain an operational and administrative flexibility if the Army pays for, and therefore controls, its own light aircraft flights. On the other hand the transport of casualties is a normal administrative function which might be performed more economically in aircraft larger than those which the Army needs for liaison or observation work. It is desirable therefore that this function should in the main be met by the Royal Air Force, so that evacuation from forward areas can be co-ordinated with any system of air supply which may be in operation in the communications zone.

It will be seen then that any idea of the Army wishing to own, still less to operate its own private air force can be discounted. But just as it controls its own staff cars and reconnaissance vehicles, so it must be master in its own house when these vehicles, for reasons of operational convenience, become airborne.

In the last few years there has been much speculation as to the uses which the Army and other Services might have for rotary winged aircraft. Like most other forms of transport, they have their unique advantages and their inevitable penalties. In this case the penalties at present lie in an excessive capital outlay for initial cost, and in time and man-power required for maintenance. However, their advantages, both operational and administrative are very considerable for those countries which can afford them, and quite small numbers of helicopters can pay an operational and administrative dividend which can be obtained by no other means. There is therefore an Army requirement for a small number of helicopters which will probably steadily increase as development proceeds and as they become cheaper to buy and to operate. Light helicopters incorporated in light liaison and air O.P. flights would be flown by soldiers just as are their fixed-wing counterparts today, whereas the larger and heavy-lift helicopters would be integrated in any air transport and casualty evacuation component which was being operated by the Royal Air Force.

The immediate need is by every means to foster the development of the helicopter with a view to reducing capital and maintenance costs. Of the three fighting Services, the Royal Air Force, which might be expected to encourage such development, is probably the least interested from an operational point of view. The Army and the Royal Navy must therefore make their needs known and keep them constantly before the Ministry of Supply and those aircraft factories which are able to undertake production of rotary-winged aircraft.

There is no doubt that the requirements of modern war will always exceed any possible scale of provision by any of the United Nations, including even the United States of America. This means that in every country there will be competition for money and man-power due to the conflicting needs of the three Services. Fortunately in England machinery exists for the solution of problems of this kind, interservice relations are undoubtedly good, and interservice staffs are in daily personal contact.

But it would be possible, and by no means illogical, to over-simplify the inter-related requirements of the Army and the Royal Air Force in the land/air battle. For example, it could be said that as it is agreed both by the Army and the Royal Air Force that air superiority is the prime requirement from which success in war in an atomic age must flow, all resources should be concentrated on achieving it at the earliest possible moment, and maintaining it throughout the conflict. This argument can be reinforced still further by stating that so little money and man-power is available to the Air Ministry that even if it were all to be allotted to this end, there would still be no guarantee that the air battle could be won at all, and certainly not quickly.

If this country was required alone to wage war against an aggressor, as it did in 1940/41, these arguments would be difficult to refute. But situated as we are, with the United States Air Force literally alongside us, and with those of the other United Nations able to contribute in varying degrees, it would be altogether too pessimistic a view. Second and lower priority requirements must be considered and given due weight, and because they are second or even third priority they must not be written off as having no priority at all.

With the Royal Air Force being required to provide so much that the Army feels necessary for the conduct of land/air operations in both the cold and the hot wars, and with resources so hardly strained, there must be a tendency for the Air Ministry to use its financial allotment for carrying out its own primary tasks and to relegate the needs of a sister Service to such a low priority that they are hardly met. Indeed it may be that, as in the case of transport aircraft of which the Army needs a particular design, to produce only a very few would be a false economy. Unless the same aircraft was being used by other United Nations Air Forces, or by civil corporations or companies, the cost per aircraft would inevitably be high, and so it is likely that there would not be enough of them to enable airborne or air-transported forces to be used effectively in operations.

This illustrates the point that the present system of annual budget, divided and sub-divided into water-tight compartments, can produce the very situation which it was designed to prevent, namely wasteful expenditure. Economy is something more than the mere non-spending of money, and it is at least doubtful if systems of financial control which were suitable at the beginning of the century can fulfill modern requirements. Today, the fighting Services find themselves in a position where there are over-laps in expenditure between two or more Services, and frequently projects for such expenditure extend over a period of years. The system may need some modification to meet these conditions so that the best value for money can be obtained.

Much could be done to reduce the cost of Service transport aircraft if one suitable type could be agreed for use by all the United Nations, and this should not be impossible of achievement. Within this country too, encouragement could be given to selected civil charter companies to operate aircraft of a type suitable as a reserve for Transport Command in war. None of the fighting services possesses an organisation suitable for undertaking co-ordination of this kind and it would seem that the only Ministry which could do so is the Ministry of Defence and it is hoped that it will take the initiative in such matters.

Inter-Service co-operation at the lower levels is generally excellent. That is to say junior staff officers and commanders of the fighting services are prepared not only to tackle, but to solve together and on the spot, any operational problem that is capable of solution at their level. It is when issues arise which are dealt with at Departmental level that serious disagreements and difficulties can occur, and these disagreements nearly all spring either directly or indirectly from rival bids for men or money. In such cases the results can be unfortunate. First, any inter-Service disagreement that can be avoided, should be avoided as it is liable to arouse suspicion and even jealousy over other matters. Secondly, inter-Service disagreements which should be capable of solution on quite low staff levels between the Departments, tend to appear on the agenda of the Chiefs of Staff Committee simply because disagreement has taken place lower down and neither Service feels able loyally to give way. This results in the Chiefs of Staff being required to give their time to matters which should never have been referred to them.

Clearly there is no simple and certainly no complete answer to this, but perhaps some easement at least of those differences which arise from rival bids for money could be achieved if the Ministry of Defence was able to give more assistance in their resolution. This might entail a Ministry of Defence vote which, though relatively small in comparison with the estimates of the fighting services, would enable the Minister to apply additional financial aid to one fighting service which finds itself in difficulties over meeting the essential requirements of another, especially where capital expenditure would be incurred. By doing so it is possible that at least some causes of inter-Service friction could be anticipated, or removed, and that an improvement in inter-Service co-operation at all levels would be achieved.

Alternatively it might be possible for the Ministry of Defence to assume responsibility for financing the provision and maintenance of a force of transport aircraft, including helicopters, which would be available for use by all three Services according to requirements and priorities allotted by the Chiefs of Staff. It is believed that at present a system of this kind is in force in connection with training for amphibious operations and it is possible that this arrangement could be extended to the provision of other forms of equipment where requirements overlap between one Service and another.

It is then essential that the Army's requirements for the various forms of air support in the land battle should be thoroughly and widely understood. On the part of the Army there must be no overstatement, and correspondingly no over insurance on the part of the Royal Air Force. Offensive support to meet a critical situation in the land battle is not likely to be made available quickly and effectively unless the machinery for producing it is practised on an adequate and international scale in peace. Suitable aircraft to provide transport support for the Army are unlikely to be forthcoming under existing conditions of financial stringency and control, and lack of international agreement on design. If our small strategic reserve is to be effective it must be both mobile and powerful. At present it can be the one or the other but, unfortunately, not both. Operational mobility is equally necessary both in peace and in war.

R. H. Bower

CHAPTER XIX

AIR POWER AND THE LAND BATTLE

By E. Colston Shepherd

The air forces of N.A.T.O. in Central Europe may be on the point of obtaining fighters specially for service in the land battle. They would have the performance of interceptors. They would carry arms equal in power to those of the standard fighters but not so many of them. They would be able to work from improvised landing strips. They would not carry the same load of electronic equipment. They are estimated to cost less than half that of the standard fighter. This in particular makes them specially attractive to those Powers which are unable to afford standard fighters in large numbers and yet expect to have big land forces engaged if a major war should have to be fought in Europe. Their disadvantage, from the point of view of a Power like the United Kingdom which has made the air arm its first line of defence, is that they could not be employed effectively except in relation to the land battle.

Some danger would therefore seem to arise of breaking the rule of concentration of force which applies with equal power to every arm used in war. The danger would not apply to the land battle, for a force of light fighters organised for tactical support could not be transferred to other duties. Lack of certain types of radio and radar would make them unsuited to metropolitan defence work. Lack of range would prevent their being used as escorts on the longer bombing missions. Lack of carrying capacity might limit their use on offensive tasks. There would be little temptation for a supreme commander to take them away from service with the army, no matter how urgent might be the opportunities in another sphere at certain stages in a campaign.

For the first time, therefore, a situation might occur in which the air commander would be unable to re-deploy part of his force and use it in the best interests of the whole campaign. He would be virtually obliged to leave it to work on an army front up to a depth of perhaps 200 miles. The army at last would have an air force irrevocably attached to it, a force which the air commander must leave out of his reckoning in considering those wider aspects of the campaign which lie far beyond or away on a flank of the army's front. It could not have been moved in the Africa campaign for instance to help in the defence of Malta so that a continuous attack on Rommel's sea communications could be maintained from that base, had such a change of emphasis become desirable.

If, in this sense, the rule of concentration seems likely to suffer, there is no sign of any similar weakening of the rule on the offensive side. Heavy bomber support can still be brought at need into the land battle. N.A.T.O. appears to be assured of that measure of flexibility by having acquired as Deputy Supreme Commander a United States senior air officer. Up to 1953 that post at S.H.A.P.E. had been held by a British air officer, following in the war-time tradition established by General Eisenhower as Supreme Commander and Lord Tedder as his deputy. The change is presumed to have been dictated by the fact that the bulk of the bomber force available to N.A.T.O. will be supplied by the United States and by the likelihood that a United States air officer acting as Deputy Supreme Commander could more readily arrange for part of it to be switched, in emergency, to army support duties.

An additional reason for the change may have consisted in the inability of the United States authorities to entrust even senior officers of other nationalities with information about stocks of nuclear weapons. A British Deputy Supreme Commander might therefore have found himself with incomplete information about certain classes of bombs for the use of which he would be responsible. There is no reason to suppose that the United Kingdom was asked not to nominate an officer for this post when Air Marshal Sir Hugh Saunders resigned it in 1953, but the circumstances doubtless suggested the wisdom of allowing the post to be filled by the United States. The position since has been that a French officer has held the post of C.-in-C. land forces in Central Europe and a British officer has been Commander Allied Air Forces Central Europe. Both are liable to receive directives from S.H.A.P.E. but on the air side these might be expected to deal mainly with the use and distribution of atomic bombs in tactical situations.

The modern method in the land battle is to have a single plan for army and air up to army corps level. That gives a certain cohesion and allows for a fair measure of concentration. The army is said to be alive to the danger of using air power in "penny packets." The understanding between army and air is reported to be close and to have been greatly improved by joint exercises in Europe. Experience in Korea, except when the Allied line was close to the Yalu river and bombing beyond it was forbidden, gave general support to the classic conception of air power's part in the land battle. In Indo-China, where the air forces were relatively small, the tendency was to use the air arm to a large extent against targets normally engaged by artillery. Neither set of operations, in Korea or in Indo-China reproduced in full the type of air warfare which could be expected to develop in Central Europe.

Both, nevertheless, impressed still more firmly on the army the value of aircraft as direct tactical aids, particularly the light aircraft for artillery spotting and minor reconnaissance and the helicopter for transport purposes. The British Army had already declared its interest in the helicopter but had appeared willing to wait until a big load-carrier had been developed to help in bridging rivers and moving other heavy pieces of equipment. Experience by the United States forces in Korea pointed to other helicopter services, including the movement of troops into the heart or on to the threatened flank of a battle. Air opinion on this subject remains cautious. The helicopter is regarded as vulnerable at close quarters; and isolated examples in Indo-China confirmed that view, yet among the more radical military thinkers it remains a subject of special interest. One argument, for instance, is that it should prove no more vulnerable than the horse proved in the Boer War, provided it were used intelligently, as the horse was not always used in that war.

One suggestion, made by an old soldier with some knowledge of air affairs, is that the small helicopter should be employed to recreate the mounted infantry. He would have two-seaters or three-seaters carrying men armed with automatic weapons and using their high powers of mobility and manœuvre to disorganise enemy operations in much the same way as the Boers on their nimble ponies upset the work of the British mounted infantry more than 50 years ago. However revolutionary the idea may appear at first sight, it does show the military mind as disposed to consider air power and air transport as a possible agent and instrument in operations on the ground. The ground to ground guided missile is an accepted new item in the soldiers' armoury. The spotting aeroplane is established. The helicopter is in use for some special tasks and is likely to be developed for others. Paratroops and glider troops have long been familiar. And now a light fighter is projected for exclusive use in support of troops.

There may be little in this that offends against the classic view of air power in relation to the land battle, for it all accepts as an essential preliminary the assertion of air superiority. The light fighter is not intended to be inferior in performance to the standard fighter although it would almost certainly be inferior in striking power and range. In return it would seem to free the army from the hampering need to consider airfields as an indispensable part of the tactical plan and so give it a measure of liberty which has been lacking in certain situations. An army blessed with the mobility of modern forces is always theoretically liable, particularly in an advance, to outstrip its supporting squadrons. If this means coming close to enemy air bases without having had them previously crippled, it can lead to extreme difficulties for the advancing forces.

Just such a situation occurred in the course of the British advance in Algeria towards Tunis in the later months of 1942. A relatively small British force pressed forward during November and early December to within sight of Tunis. It had virtually taken the Germans by surprise and had to cope with little more than 5,000 of them at the beginning, but by the time they could see Tunis, the German strength had been multiplied by three. Worse still, every mile of the swift advance had taken the British troops nearer to the enemy's air bases at Tunis and Bizerta and farther away from their own air support. This was 60 miles away whereas the Germans with 200 aircraft were close at hand. Furthermore, the R.A.F. squadrons had come forward hundreds of miles from Algiers and were suffering in supplies and maintenance from stretched communications. All the evidence shows that, in the circumstances, the British air support was splendid but it could not claim air superiority over this battle.

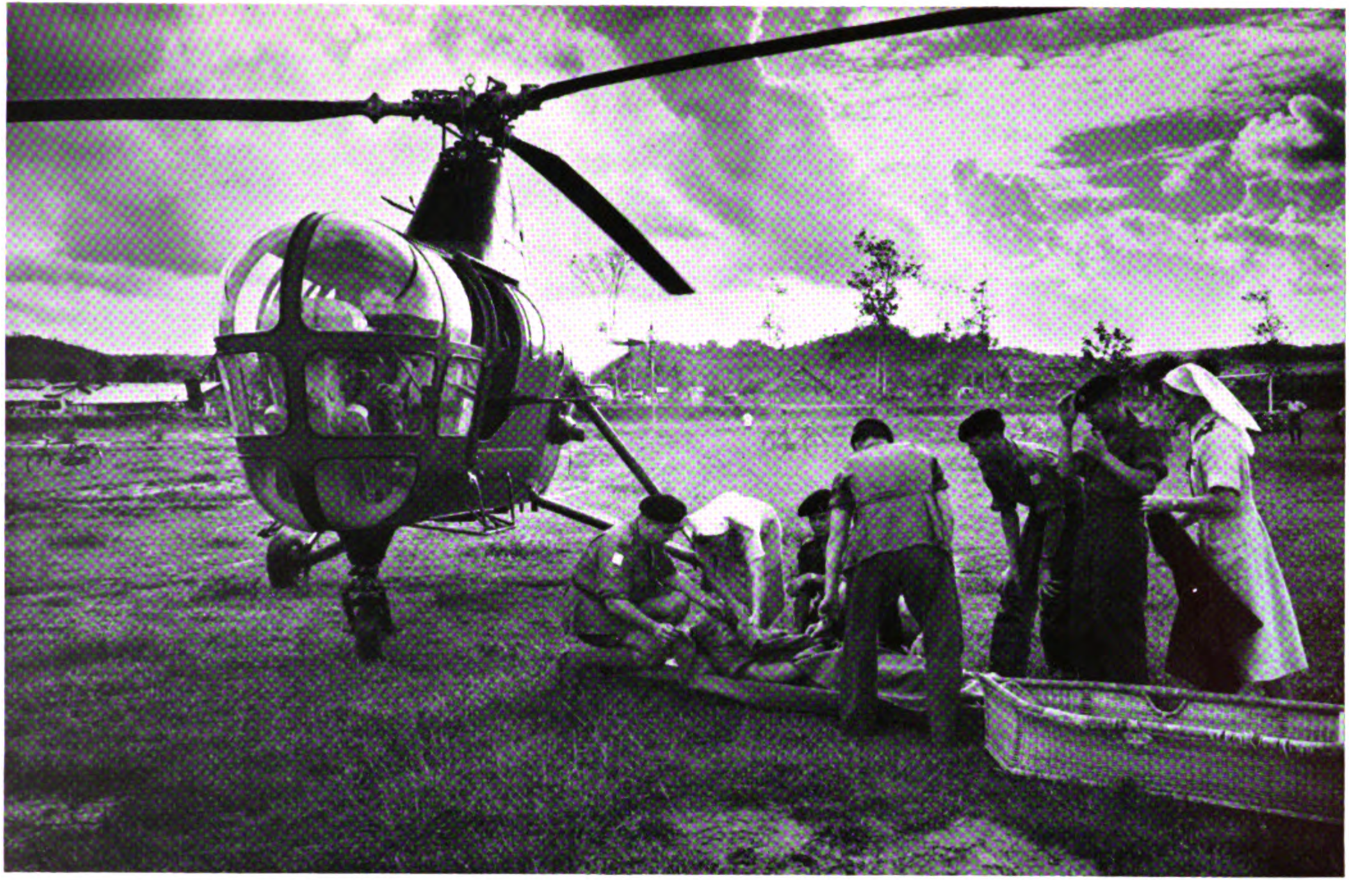
Friction between army and air was inevitable. The soldiers wanted more than the air could do and they wanted it done their way. They were not concerned that the air commander was also responsible for the protection of Algiers 500 miles away, of convoys supplying the campaign, and of long lines of communication. They took no account of shortage of airfields, of the lack of repair facilities, of radio services spoiled by the mountains or of the slow delivery of supplies. Only one airfield was available within 60 miles of our farthest advance and on that field five squadrons of Spitfires were crowded but, lacking spares and proper maintenance, they could usually operate only at half strength. An attempt was made to operate from a field immediately behind the front line but it was so costly it was not repeated. The bombers at first had to work at long range and at the end they still had a journey of 180 miles to their chief objectives. The 78th Division had ultimately to fall back.

No more telling instance of the importance of a single plan for army and air need be sought. At the same time, the incident points again the danger of army insistence on air support of a particular kind and in a particular form. Air superiority the army must have. Yet there is no exact general prescription for the establishment of air superiority. Wing Commander H. L. Thompson in the introduction to his book "New Zealanders With the Royal Air Force" makes clear once more the complex nature of it in the last war. He says:

> The achievement of Allied supremacy in the air was not a relatively straightforward issue like a naval or land battle. It was certainly not just a series of combats between fighters; rather was it a complex affair involving many kinds of operation carried out by many types of aircraft. . . . Altogether, it was a campaign rather than a battle and one in which the advantage swung from side to side as scientific and technical discoveries were applied to the war in the air. Many found this difficult to grasp since operations designed to secure and maintain command of the air were often not visible to those who were benefiting from them and, in the early days of the war, this was a frequent cause of misunderstanding.
>
> On the other hand, air superiority was only achieved and maintained with the aid of the land and sea forces. Supplies had to be brought by ships and airfields had to be secured and held against the enemy land forces. Without supplies or deprived of bases, air forces could not operate. Altogether, final supremacy in the air was wrested from the enemy only after a long and bitter struggle, a long-drawn-out battle of wits by day and by night in fair weather and foul.

That first sortie into Tunisia by the 78th Division and the parallel thrust by United States forces farther south showed that the contriving of air support is an even more complicated and specialist business than, for example, the deployment of armour. Repair and maintenance rank as high as airfields; the protection of supply bases is as much a part of the service rendered to an advancing army as the flying of fighter and bomber sorties over it. The curious thing was that the swift advance from Algeria should have been undertaken without full and comprehensive provision for air superiority. The army no doubt was tempted to take every advantage of the enemy's unreadiness to meet an attack from the west. He was being hard pressed from the east by the 8th Army. His supply routes from Italy were under continuous and increasing air assault. He could be presumed to have little weight with which to oppose the new danger from the west. There were reasons for trying to take Tunis while he was still off balance, without waiting to establish air superiority. The enemy reacted more quickly than was expected; and the army sought to blame its air support for its temporary reverse.

Air power in Algeria was, of course, suffering from its own difficulties at that time. There was no effective unity as between British and United States air forces. That was contrived after the first check in Tunisia and it was arranged under the direction of Lord Tedder, whose success in Egypt and Libya should have marked him out much earlier as the adviser on air support for the "Torch" campaign. He was not in fact consulted. He is said indeed to have been "only vaguely aware" that the Torch campaign was impending, yet he and the late Sir Arthur Coningham had acquired between them a mass of experience in working closely with the



(Picture Post Library)

MALAYA. A man wounded in the jungle is brought in to hospital by helicopter

other Services and also a detailed and expert knowledge of air fighting in circumstances of intense mobility. A characteristic signal from Coningham to Tedder in 1942, when Rommel was pushing the army back to El Alamein shows the masterly technique which had been worked out to enable the squadrons to keep pace with movements on the ground.

It ran:

> I have prepared landing grounds all the way back to the frontier and plan is steady withdrawal of squadrons, keeping about 20 miles away from enemy. See our own bombs bursting is rough deadline. As units move, repair and salvage units clear up. Squadrons fearful of being taken too far from enemy as they like present form of warfare. Squadron commanders explain situation to voluntary parade of men daily, and point of honour that there are no flaps and nothing left for enemy. Am content that whole machinery working very smoothly.

That might be thought a relatively easy process since the squadrons were moving back to prepared fields. In fact the record was as good in the advance from El Alamein and on across Libya to Tunisia. The fighter and fighter-bomber squadrons kept pace with the ground forces. During the advance on Benghazi, there were even two squadrons of Hurricanes based well ahead of the troops, so that enemy convoys of lorries might be attacked effectively as they retreated. And all the time the Royal Engineers were busy repairing airfields, getting the mines out of them, and making new airfields where necessary. The single plan for army and air worked remarkably well in advance and in retreat. That plan was worked out jointly and in the process army proposals were subject to constructive criticism from the air side. Behind the joint tactical planning was the thorough organisation of air technical services, in the preparation of which, Tedder had been obliged to go his own way, ignoring the disapproval of Whitehall and leaving the reckoning to be done and the red tape unwound after the job had been completed.

All this tactical air support was woven into the bigger plan for asserting air superiority. This included the tenacious hold on Malta for the purpose of watching and assailing enemy supplies on their way to Africa. It included bomber attacks on enemy bases and ports. It involved attempts to fight convoys through to Malta. It embraced reconnaissance far beyond the limits of the land battle. In the later stages it brought into the operations some of the United States units and so began the joint air effort with which, on a much bigger scale, Tedder and his ways were to be associated in Algeria and over Sicily. The campaign was invaluable as a fairly compact example of the jigsaw of air superiority, of the elements of land-air warfare and the climate required to foster it and of the zest with which the joint task can be undertaken when confidence and understanding have been established. The contrast between the desert campaign and the early phases of the Algeria campaign is so marked as to suggest that little was known at home of the way the affair had been tackled in Cairo. Tedder's empire may have been still more remote and autonomous than the onlooker suspected at the time.

One of the most valuable things Tedder and Coningham had done in that campaign was to wean the soldiers from their worst temptation of trying to insist on the form and manner of air support. To say that this was done by gaining their confidence is not enough. The air commanders identified themselves with the land battle and refused to have themselves

13

regarded as an addendum to it. They were found by the soldiers to have a sound comprehension of the army's task. They could occasionally make useful tactical suggestions. One of their minor triumphs was to persuade the army to adopt the air force system of operations rooms and that after staff officers had declared the idea to be impossible of realisation in the stress of battle. Most important of all, the commander of the tactical air forces lived all the time alongside the army commander and had at his disposal all the information that reached army headquarters. By the same neighbourly association, the army commander was apprised of the reasons for applying air power in such and such a way to meet a particular situation. He came to appreciate the wider duty which lay on the air forces outside the battlefield.

Tedder had got his way accepted and had fully justified his methods by the time when the Torch campaign was launched. As it ran into difficulties, Eisenhower looked for help to the Middle East and asked for a team of air advisers. Tedder's reply was of interest as revealing the depth of his belief in the need, not only to see a situation as a whole, but to have to bear the responsibility for acting on any opinion formed. On the subject of sending air advisers, he wrote: "I would strongly urge 'no' since I consider that advice without executive responsibility is worse than useless and, with the best will in the world, will cause friction." He was to have the executive responsibility for the whole Mediterranean air command before long. In that post he was to secure Anglo-American co-operation and was to work for acceptance in the army-controlled air force of the United States of the British principle of air independence of the army. As he had said when he was first consulted about the air situation at Algiers, "a lot depends upon personalities."

What happened in Africa in 1942–3 cannot be ignored in making plans for air support in any land battle of the future. The introduction of new weapons and the raising of performance levels will not displace the principles which were proved in those campaigns. There were elements in those operations which might seem to endorse the idea of close physical relation between air units and ground formations. Coningham's insistence on keeping the fighters close to the front line and the troubles that arose near Tunis from the inability to keep the Spitfires close to the head of the advancing column, can be used as arguments in favour of N.A.T.O.'s light fighter working from the simplest of air strips in the forward areas. The United States has already contributed a pilotless bomber, the Matador, which has a range of about 200 miles. There will doubtless be a British version of the expendable bomber but it will presumably have a much longer range if it complies with the British philosophy of regarding a theatre of operations as constituting the tactical whole rather than the immediate neighbourhood of the land battle.

Similarly, the distribution of repair and salvage units among the most forward units of the Desert Air Force would seem to sanction the plea for giving air support a geographical as well as operational association with the troops. A further development of this close contact appeared in Southern Italy when the "cab rank" system was introduced and fighters on call were controlled by air force officers attached to the forward army formations. Later still, in Normandy when the army had remarkably little elbow room and no considerable rear area, the air force worked quite satisfactorily from hastily prepared strips. The army, and especially a continental army, can be excused for asking why a light fighter capable of working only in close association with the army should not be acceptable in preparing against the risk of a land battle in which the enemy might be expected to rely chiefly on his big battalions. The question gains force when the apparent saving in cost is examined, for the light fighter might be obtainable at less than half the price of the standard fighter.

In the present situation, continental Powers are entitled to assume that Britain and the United States will provide large contingents of standard fighters as well as all the medium and heavy bombers. Might not those Powers be left to cope with air superiority on the theatre basis and leave to the continental Powers the duty of securing local superiority over the battlefield itself? The arguments are dangerously attractive. Obviously there must be specialist aircraft, as there have always been since bombers and fighters were added to reconnaissance aircraft soon after the 1914 war began, and some types will be capable only of one class of work and no other; but something of the essential quality of air power will be lost if specialisation is carried too far. Flexibility is an aid to the concentration of force in an emergency. It is better to be able to divert long-range bombers to short-range tasks on occasion than to try to stretch them when the demand is reversed.

The United States has chosen the Canberra bomber for ground-attack duties and the British have produced a photographic reconnaissance version of the same bomber. That would seem the wise course in allocating specialist functions, taking a type which has something to spare and can embrace the particular duty with ease, especially in the matter of range and equipment. A wide measure of operational mobility, as distinct from tactical mobility is thereby preserved and with it the means to meet a great variety of situations. Strict specialisation is justifiable only when the desired purpose is so important and so difficult to attain with any form of compromise, that necessity is insistent or when there are armaments to spare and a force can allow itself luxuries. The night fighter is an example of the first category although it now promises to merge itself in the class of all-weather fighters. In present circumstances, a high-level fighter would fall in the second category. It would probably be rocket-driven and have a remarkably short combat duration, yet there are some, close to modern aircraft development, who would claim that the high-level fighter has already become a necessity because of the high operational ceiling of the latest bombers.

Dogmatism is perhaps the most unwise form of argument in relation to air defence, for the art of air warfare can so easily be shown to produce a crop of paradoxes. There was a time in Africa when the Hurricane fighter seemed likely to be transformed into a tank-buster. The Lancaster bomber had a part to play in anti-submarine warfare with Coastal Command far out at sea as well as with Bomber Command over the U-boat pens at Brest and Le Havre. Fighters organised for the defence of London shared in protecting the evacuation at Dunkirk. In the invasion of Normandy, bombers helped to protect the fleet of landing craft first by flying numerous decoy sorties on another course and afterwards by smothering enemy coastal batteries. Later, near Caen, they were brought in to bomb an enemy front line. A more remote tactical operation by the big bombers consisted of the repeated attacks in the autumn of 1940 on the assemblies of barges intended for the German invasion of England. There is still no guarantee that they would have been used if they had not been so heavily attacked, for Kesselring has lately claimed, without much evidence, that he had asserted the requisite air superiority and has blamed Hitler for having no clear-cut invasion plan ready. Whether the invasion failed to take place because the R.A.F. won the Battle of Britain or because the barges were destroyed or for both reasons is of less importance than that air action saved both army and navy from having to fight that particular battle and saved them with forces that had nothing to do with army support or naval co-operation.

This exasperating refusal of air power to arrange itself in neat and clearly labelled packets for use in specific and exclusive duties is a warning against any attempt to put tactical air forces permanently into separate and inviolable compartments. The work that has normally to be done by air power in the land battle is clear enough. Air superiority is indispensable as the umbrella beneath which all the rest proceeds. Reconnaissance is necessary. The isolation of the battlefield, if fully achieved, can be a determining factor. The trouble is that no air tactician can be brought to say with finality what interdiction will involve or how far from the front line it may have to be extended or what strange twists and quirks it may demand. Where, for instance, should interdiction in the battle for Crete have begun and how might it have been applied and whose duty should it have been? If appropriate action could have been taken in that instance, it would have proved to be part of the general struggle for air superiority and if that battle could have been won, there would have been no invasion of Crete just as there was no invasion of England for a similar reason. The moral, if one is to be drawn, is that tactical air forces should not tend to restrict the scope and reduce the variety of their operations but should seek to have a reasonable margin beyond the normal run of the operations involved in army support.

In the basic unity of air power, as seen by the British Air Staff, lies its real power. Among the N.A.T.O. Powers in Europe, two particular considerations tend to link air power with the land battle. They are the direct interest of those Powers in avoiding occupation by the enemy and the economic difficulties which prevent them from making contributions to the offensive side of the Allied air forces. The temptation to make offence and defence two separate matters is hard to resist. Britain and the United States virtually hold the monopoly in bombers; the continental Powers make their contribution in fighters and in armies. Why not have more of those fighters by sacrificing something which, in working with armies, they will never miss? Offence can then be left to those who have bombers and the wider aspects of defence can be left to them too because they are already equipped with standard fighters. The logic of the argument might be expected to appeal to the French. It appears to have been allowed by the Supreme Commander at S.H.A.P.E. We have no information as to how it is seen by the Commander Allied Air Forces Central Europe. What is clear is that it revives in part the idea of air forces tied to army formations and moves away from the idea of air power as an organic whole capable of applying its various parts in different aspects of a general task.

That idea would be equally abandoned if bombers were strictly reserved for strategic duties. Land battles are not the whole of a modern campaign. The most telling blows may not even be struck on battlefields. Air power has still to deal with a theatre as a whole. It still needs to be able to concentrate its strength at the point of decision whether that be on the battlefield, on embarkation ports, along lines of communication, at sources of supply, or wherever the enemy can most surely be frustrated. Anything which diminishes the ability of air power to switch its forces to the task of greatest opportunity is an offence, not against a dogma, but against principles which 50 years of experience have gone far to establish.

E. COLSTON SHEPHERD

CHAPTER XX

THE ARMY'S SUPPLY PROBLEM

BY MAJOR-GENERAL B. T. WILSON

"We must do our utmost to beat off the mortal dangers that beset us. Unfortunately it is all a matter of supplies."

Rommel at Mareth, Feb. 43.

WHEN KITCHENER destroyed the Khalifa's army at Omdurman in 1898, over 20,000 tribesmen were killed stone dead on the battlefield. It was the first demonstration on living targets of the death-dealing power of the small-bore magazine rifle. Somewhat nettled at the ease of the British success, continental military experts drew comfort from what they called the lesson of this colonial episode. It was that the nations of the West would always have the advantage over mass invaders from the East, because of the superiority of their weapons.

How sadly wrong the experts were!

We look eastwards this and that side of the Urals, the Volga and the Caspian and see many nations being compelled to spend themselves in furthering the grandiose schemes of a military and economic despotism. The first object of their devoted slavery has been to make a sufficiency of modern weapons. They have achieved their object. Where so-called "conventional" armaments are in question, the U.S.S.R. can match and overmatch the armouries of the West. Even in the production of atomic weapons, the U.S.S.R. claim equality with the West, although this is probably one of those inexactitudes which commonly crop up so often in the cold war. In the event of Eastern aggression, therefore, N.A.T.O. must be absolute for total war against an uneasy host of many states, which are as well armed as itself and more nearly on a war footing.

The U.S.A. and Great Britain, the chief partners in N.A.T.O., have the unfamiliar task of planning the defence of the West as though they themselves were Great Powers living on the mainland of Europe. It is to be noted with the greatest attention, that the military problem before them is a particular problem and not a general one. Germany has faced it for centuries and knows far more about it than any other nation in Europe. Latterly she has learnt almost everything there is to know about refugees, bombed cities, destroyed communications, and all the other terrors of total war. It would be great folly not to make full and practical use of her unique experience, her geographical position, and her aptitude for war. At long last she could assist in saving Western civilisation, instead of trying to destroy it. If the problems of making the West unassailable can be solved, military problems elsewhere in the world would fade into insignificance, because they all stem from the fatal weakness in Europe.

To prevent war, N.A.T.O. must manifestly be able to wage it better. It must contrive to be a lap or two ahead of the potential enemy in every warlike activity likely to unfold itself in Europe. One of the greatest of these is logistics—the science of moving and supplying armies. As logistics deal essentially with matters of fact, a realistic picture is necessary of the new forms which fighting in Europe may take. To many who ponder this fascinating subject, air power with its atom bombs seems to have become so supreme that armies tend to turn into mere "moppers-up," who will move more or less on march tables to occupy ruined cities and wasted countrysides. It has been credibly reported, for example, that a single atom bomb can make a crater, which is a mile wide and 175 feet deep. This is a hole larger than the awe-inspiring crater of Vesuvius. At first sight such deadliness rather favours the march table theory. It even recalls the savage wish of Alexander the Great that his enemies might have only one neck so that he could kill them all with one stroke.

A few atomic missiles deftly dropped in Western Europe by the U.S.S.R. or contrariwise in the East by N.A.T.O. would certainly play ducks and drakes with the tiresome capitalist and communist "ways of life." But they would not achieve for either belligerent that complete destruction which Alexander desired. Indeed the fury of the contending air fleets might at first be so terrific, as to leave the rival armies free to fight on operation orders much as usual amidst the brickdust and the ruins.

The direct hit of an atom missile obliterates a bigger area than TNT, yet protection against its other dismal effects is still to be found in underground shelters, from the glorified fox-hole to catacombs as big as towns. Wide dispersal would ensure that atomic direct hits accounted for as few men and as little material as possible.

Nor is the supply of A-bombs unlimited. Their use will presumably be restricted to especially important targets. It also seems probable that armies at grips with each other will be spared the ultra Vesuvian type of crater, lest friend and foe all perish together. It is said, nevertheless, that small A-shells fired with great precision from long-range guns will be available for breaching lines of defence. This shell is promised to make the formidable "break-through" battle much easier than it was, so that the passive defence of long lines is more than ever likely to be an unrewarding form of war. Yet the defence should still be able to make special arrangements for holding fortified areas of considerable size and organised in great depth. Such areas, especially those along the sea, would serve as pivots on manœuvre and magazines of supply, much as the fortresses of the 18th century did. Between these substantial areas, capable of being supplied from the air, a defending army must operate offensively, striving to cut off and destroy enemy main bodies as they advance. It may well be that the best defence for an army considerably weaker than the enemy, will be to seize the initiative at the outset by occupying some important complex of air, sea, rail and road communications well within the enemy's frontier. Such a stroke might cause doubtful satellites to change their allegiance over-night and to join the Western armies of liberation. Stranger events than this have happened in history.

Such, then, would be the rough framework of another war in Europe. The armies taking part, whether large or small, must essentially be able to move, dispersing to live and uniting to fight just as Napoleon's armies did. Their spear-heads would be aircraft and armour, their main bodies armour, artillery, and infantry. If well commanded and well balanced as to their components, the combatant troops would be able to move and fight as required. They have wonderful mechanism to enable them to do so. But there is one important proviso. They must receive without interruption their daily needs in food, ammunition, P.O.L.,* and all the other multifarious requirements of the modern battle.

Curiously enough, this is not a condition, which seems to have troubled Napoleon at all. Yet he habitually moved up prodigious loads of artillery ammunition (300 rounds per gun for 200–300 guns) to his big battles. Rations were, to him, a minor detail. About them Clausewitz says, in his lofty way, "If war is to be carried on in its real spirit, the sustenance of the troops although important, is but a subordinate affair." He then goes on to quote with great gusto Napoleon's customary rejoinder to importunate Quartermaster-Generals, "Qu'on ne me parle pas des vivres." French soldiers of that time had to look after themselves, much as Russian troops are said to do today.

Such a slight regard for his rations would not at all amuse the soldier of a welfare state. Indeed he would consider the absence of any item of his needs for battle as a sign of the gross incompetence of the staff.

Yet today, air power and to a lesser extent long range guns, have made the supply problem the Achilles heel of modern armies. Wonderfully equipped, they are today far too inclined to rely on a long line of rail and road communication for the supplies, which enable them to move and fight.

Not merely these long communications, but also the base from which they start, will constantly be subject to air attack. Already in 1944 at the Normandy battle, the roads within 30 miles of it were, during daylight, almost unusable by the German army. Of this Rommel said feelingly, "To have to fight without adequate air-cover, is sentence of death for any army, however large."

Adequate air-cover presumably means something near equality of air power. Precisely what protection such near equality would give is one of those unknown quantities which mathematicians would call ϕ or θ. However, these symbols might pan out in real war, it would be a most gross error to imagine that the supply columns of N.A.T.O. would necessarily be able to roar along the roads, as those of the Allies did after Normandy. The Luftwaffe by then had been completely dominated and it had taken the R.A.F. and the U.S.A.F. years to do it. On the other hand the Red air force would not at once master the technique of destruction. At the start of hostilities "air pressure" would come on more slowly than people imagine.

It is clear, however, that the idea of "lines of supply" is quite out of date. Lines are just too vulnerable to air attack. The correct conception, now, is surely the "network of supply." To make this change will be an interesting throw-back to the past, when the old strategists spoke of being based on Westphalia or Bohemia or the Palatinate, because their military supplies were requisitioned in every corner of such dukedoms and small kingdoms.

For a different reason, bases for the defence of the West will be whole geographical entities as big as France and Flanders. Widely dispersed in them a vast network of harbours, airfields, warehouses, factories, installations, stockpiles, pipe lines, railways, roads and signal communications will deal with military supplies. Many important facilities and utilities will be underground. Most of Europe is already well versed in the technique of wide dispersal: it must be studied again in good time.

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* P.O.L. = Petrol, Oil and Lubricants

Granted a widely flung network of supply, the transport of supplies to a multitude of railheads should not prove insuperably difficult, even with only moderate air cover. Both British and German experience in 1939–45 showed that damage to railways can be repaired with astonishing speed, cf. the almost legendary "marshalling yards of Hamm." The locomotive, a prime mover, which can haul nearly 1,000 tons more conveniently and economicably than any other power unit, is still indispensable on land as the ship is at sea. It must continue to play its vital role in lifting supplies.

The railway network would, of course, be conditioned in every possible way against air attack and be made as flexible as ingenuity could make it. Special measures would cover the safeguarding of rolling stock, the initiation of rapid repairs, and the holding of spare stores and up-to-date repairing machinery. On the railways, as everywhere in the theatre of war, a multiplicity of small shelters will enable railwaymen to escape the worst effects of any kind of bombardment. They give dispersion, are easy of access and cheap to make. Fox-holes have indeed quite a future in total war and would have interested Diogenes.

The most difficult part of the supply lift would almost certainly be the last hundred miles, where roads come into action. In good times long columns of 3–5-ton trucks driven chiefly at night would, no doubt, duly arrive at refilling points. During the critical days of a long battle, however, it is likely to be another story. The forward roads would then be almost certain to receive heavy punishment and to go on receiving it. Aircraft, long-range guns, and self propelled missiles would all be at work "isolating the battlefield." About the same time, masses of terror-stricken refugees would tend to bring the roads to a crescendo of confusion.

Under such conditions, a column of 3–5 supply lorries "crowded at a check," would seem to bear about as little relation to modern war as a line of squeaking bullock wagons on a dusty grand trunk road.

This proneness of road transport to air attack and traffic jams is of course the chronic disability of logistics. As with most chronic conditions, no single royal remedy will at present cure it. Much, however, can be done to alleviate it.

A formation commander, who does not at once provide himself with a really first class provost marshal and tip-top provost units, knows little about his business. Without good traffic police he will be unable to control the rear framework of the battle. Underground traffic posts interconnected with buried telephone lines will help to make the roads as little subject to traffic jams as railways. Well trained British military police should be as good or better than those of any other race and should never be at a loss to know what to do.

The "network" conception applies with even more urgency to roads than railways. There just cannot be too many forward roads and laterial roads. Properly briefed, the engineers can plan it all and lay it on when the signs and portents of war become too pronounced to be disregarded. They will be able to effect great surprises for the enemy in multiplying the facilities for forward movement of traffic.

The density and speed of traffic on roads is a familiar subject for staff study. British practice favours slower speeds than that of the Americans, the French, and almost certainly the Germans. The U.S. supply trucks on a "Red Ball" road in 1945 moved at breathtaking speed with not a smash to be seen in 200 miles (noted on a journey). To step up speed and reduce density seems to be a commonsense measure requiring little argument but much training.

Obviously enough one of the best ways of reducing the density factor in road movement is to reduce the tonnage of supplies which have to go forward daily. This question is, so to speak, the "beaten zone" of controversy, into which the outside enquirer advances with fear and trembling. Nevertheless a quick glance at the daily lift of supplies for a division must be ventured.

In 1914–18 a division used to require a pack train of about 500 tons every day. Now it is said to take 600–700 tons. It is not possible to give an exact breakdown of these formidable figures. Yet even a very rough estimate will be valuable:

	Tons
Needs of the troops: food, water, ordnance stores, post, N.A.A.F.I.	50–100
Ammunition for a day's fighting	250
P.O.L. for 100 miles	250
Engineering and other stores—variable	50

Ammunition and P.O.L. are largely complementary to each other for when one is being used, the other is not, and vice-versa. This relationship gives the division a valuable reserve of carrying power, which is nearly always used for one purpose or another.

The needs of the troops form only a small fraction of the total lift, yet even so, Russian style austerity would result in an appreciable saving of tonnage, much of which has to go right into the forward zone. An austerity scale during operations would be accepted by the troops with their usual calm if they knew the reason for it. A luxury scale could be given as a recompense during their periods of relief. Detailed scrutiny of the needs of the troops would probably show that 20–30 tons could come off the daily divisional lift without any real hardship being inflicted.

Where ammunition is in question, it is impossible not to wonder whether artillerymen do not habitually over-estimate their needs. Ammunition has often been in short supply from the factories. Shortage at the guns in battle, however, can seldom have been due solely to the inadequacy of the ammunition scales.

An experienced commander of armour recently drew attention to this matter in an important lecture at the R.U.S.I. He pointed out that 5,000 rounds of A.T. shell are held for the Centurions of his division. Yet the Centurion's gun is so accurate that one shot in two ought to be a direct hit. As a bag of 500 enemy tanks per diem would be all that he wanted, he thought that to hold 5,000 rounds in the échelons was over-insurance. The startling accuracy of the Centurion's gun may have surprised even those who have to devise ammunition tables. Still, this particular example does seem to suggest that the artillery échelons call for careful review. A reduction of 30–40% in the scales of ammunition might take 80–100 tons off the daily lift up the forward roads.

The petrol lift shows what a big saving in haulage could be effected by piping petrol as far forward as possible. But the last hundred miles are always likely to be too hot for the niceties of pipe line installations. No great saving, therefore, seems possible in the petrol lift.

Confronted with reducing the daily divisional tonnage of supplies a really determined reformer should thus aim at a cut of 100–150 tons. Even then about 500 tons would still be left. Of this load perhaps as much as 100 tons would not be going as far forward as the various kinds of refilling points. That leaves 400 tons as the ultimate irreducible daily load—say 140 3-ton lorries. Here the importance of a broad network of forward roads leaps to the eye. With as many as four such roads and 35 lorries per road, the problem looks as manageable as the limitations of road transport in an air-dominated war permit. Skilful dumping will help to ease matters at times and jeep transport companies will often be useful for shuttling supplies over a damaged stretch of country. Yet when every remedy which experience can suggest has been applied, air power can be so destructive that the ultimate 400 tons might be confronted with a deep belt of terrain as devastated as the watery wastes of Passchendale in 1917. The only conceivable remedy, then, would be supply by air.

Now although the R.A.F. was able, by being a separate service, to save Great Britain from early defeat and to make ultimate victory certain, the same sturdy independence has always hindered the speedy solution of the Army's particular air problem. Today the air transport and air supply of the Army are surely activities, which are well behind the times? Air transport is notoriously scanty and out of date at a period, when our precious divisions are scattered in far countries. Air supply is so rudimentary that it is only invoked as a last resort when all other methods have failed. Parachutes then proceed to scatter valuable supplies over acres of country and free dropping adds to the other hazards of war. It recalls the story of a distinguished, but old fashioned, physician, whom his colleagues called the angel of death, because he was only called in as the last hope and usually effected nothing.

It is inconceivable that the Army, if it had its own air force, would not already have developed something better than parachutes and free dropping. *Brassey's Annual* 1952, Ch. xxviii gives an account in some detail of special transport aircraft, which can land and take off from improvised air strips and also of a wide range of helicopters. A combination of the two machines seems to offer prospects of an air supply system, which would go far towards putting three-ton trucks permanently out of business. It is true that the questions of "adequate air cover" and the weather remain. In any event the helicopter bids fair to be effective for supply purposes, even with sketchy air cover and indifferent weather. It could almost certainly be used for shuttling supplies across a belt of devastation.

At a time when money is being voted as never before in our history for the re-equipment of the services, it seems incredible that, so far as is known to the writer, the air supply problem of the Army is scarcely being touched. Surely a great chance of tackling it a lap ahead of other armies is being missed?

A useful first lap would be to provide sufficient helicopters to cope with the ultimate 400 tons of the daily lift for a division. At three shuttles per night, 24 helicopters each with a six-ton detachable "pod" (on wheels) would suffice to carry 400 tons from railheads to refilling points. In other words two squadrons, each of 12 helicopters would constitute a reserve air transport wing to deliver supplies when all other means were useless. Its creation might be the first step in making the Army truly mobile, which at present it is not. The sponsoring of an air transport wing of this size would not be difficult. As soon as practicable the R.A.S.C. would take it over.

The control of air transport for supplies would have to be done at Army Gp. in collaboration with Tactical Air HQ. where air policy and action is necessarily highly centralised. Army Gp., to which the vast network of the base is subordinate, would direct supply policy in its main outlines, with the headquarters of Armies as its chief executives. Corps HQ will tend to be more concerned with the fighting of its five or six smaller sized divisions than with the administration of supplies. The division would then be the next administrative executive with a link at brigades, whose commanders should be left as free as possible to tackle their main job of fighting. Some such simplification of the command organisation would add resilience to the whole system of supply. The present set-up resembles, far too much, a long train of railway trucks, which start with a succession of jerks and stop with a sequence of loud bangs.

The following broad conditions can now be drawn from this fleeting survey of the Army's supply problem:

1. The Army supply system will be required for a possible war in Europe and should be designed accordingly.
2. Single bases and lines of supply from them should give place to a very large network of base installations with many lateral and forward communications so as to ensure, everywhere, a wide dispersion against air attack.
3. The weight and density of supply traffic on the roads should be rigorously reduced by every measure, which ingenuity can suggest.
4. Air Supply, which for practical purposes does not yet exist, may often be the only means of delivering supplies across a belt of complete devastation caused by air attack.
5. The Army should, as a start, press for the immediate creation of a reserve wing of helicopters for supply purposes.
6. Army Gp. and Armies will be chief executives of supply. Changes in command organisation will add to the resilience of the supply system.

In effect, the administration of the Army in the field today differs little from that of 1914–18, when the comparative insignificance of air attack permitted the supply system to be lavish and unwieldy. The three-ton lorry is still the prime mover of supplies to refilling points. It is time for a change.

B. T. WILSON

CHAPTER XXI

GLIDING AND ITS POSSIBLE VALUE TO AN AIR FORCE

By Philip Wills

THE SPORT and science of gliding has made giant strides ever since the late war, and its value and potentialities are now more widely recognised.

In Great Britain in fact there is now nearly unanimous agreement that, as an aid to recruitment to the Flying Services, gliding has an invaluable part to play. There is, however, a growing belief, though still a minority one, that it may have an additional deeper value than this.

The gliding activities of the Air Training Corps undoubtedly attract a large number of recruits, and the fairly elementary training in gliders which Cadets receive gives them their first actual taste of the air. But few people maintain that this training yet goes far enough either to serve as an aptitude test for future service pilots-to-be, or to shorten the actual amount of powered training which subsequently has to be given.

There are in my view six possible ways in which gliding may be of use to the flying services:

(1) As a recruiting medium.
(2) As a method of reducing training wastage during power training.
(3) As a method of reducing training hours on powered training.
(4) As a method of giving power pilots additional training which will improve their pilotage in particular fields, which cannot be acquired in any other way.
(5) As a method of research into certain branches of aviation which can be done better and cheaper on gliders than in any other way.
(6) As a method of making a whole people "air-minded" and so solving the problem of shortage of recruits which seems to be a general difficulty in most Air Forces, and indeed in Civil aviation also.

I will only say at this stage that only (1) above has so far been generally accepted in this country. (2) to (5) have not yet been adequately tried out. Personally I have an open mind on their validity, but believe it would be well worth while to make full-scale trials under each heading. (6) is much the most important, and to my mind has been conclusively proven in Germany, which before the war founded the Luftwaffe almost entirely on the German gliding movement. At the same time they created a nation-wide general enthusiasm for all air matters so deep that today, after little more than a year's re-development, the post-war German gliding movement probably exceeds in numbers and enthusiasm that of any other country. When Germany is again permitted an Air Force, there will be no shortage of volunteers to man it in all its branches.

Let us now look at what can be achieved in gliders and sailplanes. A bare recital of current world records may surprise many.

Duration, which many outsiders think is the main ambition, is no longer thought to be much more admirable than pole-squatting. So long as the wind blows up a particular line of hills, so long can a glider fly up and down along the crest of that hill. There are parts of the world where the wind blows steadily from one direction for months on end. The only limit therefore is the physical limitations of the human frame. If someone thought it worth while to build say a two-seater cabin glider with one bunk and a lavatory, the duration record could be put up to say three months and left at that, to the general relief of most of us. The present record is in excess of 52 hours.

Distance in a straight line is one of the most respected records. The existing (January, 1953) record in this category, for single seaters, is 545 miles. This flight was carried out in thermal conditions by Richard Johnson (U.S.A.) flying an R.J.5 from Odessa (Texas) to Salina (Kansas), August 5, 1951. The R.J.5 is an experimental prototype sailplane, of 55 ft. span, with laminar-flow wings, and a maximum gliding angle in excess of 1 in 40.

The other most dramatic type of gliding record is Absolute Altitude achieved above sea-level. Here the palm at present (and probably for some time to come) goes to Edgar & Kleeforth (also of the U.S.A.), who flying a two-seater sailplane in the Bishop Wave in California achieved the startling height of 44,250 ft. They came down not because this was the limit of the upcurrent, but because this is the absolute maximum height at which the human body can live on straight oxygen alone. Before anyone can go higher, someone must finance and build a pressure-cabin sailplane. When they do, the Bishop Wave—and probably other waves in other parts of the world—almost certainly extends to 60,000 ft., and quite probably to 100,000 ft., and beyond. In fact, eventually it is probable that the sailplane height record will exceed the aeroplane height record, because the lower stalling-speed of the former enables it to go higher before getting into sound-barrier troubles. The higher you go, the higher is your True Air Speed in relation to your Indicated Air Speed. The speed of sound is a true Air Speed, stalling speed is related to Indicated Air Speed.

So far I have referred to the three main types of lift used so far by sailplane pilots. Perhaps I should give a brief further explanation of each kind.

Hill-lift is obvious. When the wind blows up a line of hills or mountains, an area of rising air must be created along and in front of the crest. Gulls soaring over the cliffs in a sea-breeze are hill-soaring. This is the simplest kind of soaring both to understand and to do.

Thermal upcurrents are created mainly by differential heating of the earth's surface. On a sunny day the roofs of a town will be hotter than the surrounding green fields. The air in contact with those roofs will become hotter than the surrounding air, and since warm air is lighter than cold air, will rise. The height to which such a thermal current will ascend depends on the "lapse-rate" prevailing on the particular day. This is perhaps not the place for a meteorological exposition, so I will limit myself to saying that on suitable days, thermals may rise high enough to create cumulus clouds, and, on very unstable days, cumulo-nimbus clouds which may ascend to heights of the order of 40,000 or even 50,000 ft. Lift inside these clouds is stronger than beneath them, and the maximum rate of climb so far experienced in a sailplane in South Africa was around

100 m.p.h. In the U.K. the usual rate of climb found in cumulo-nimbus so far has been not more than 40 ft./sec., or say 30 m.p.h.

The technique of utilising thermal upcurrents is, first to find them, and once found, to circle within them. As a thermal blows along with the wind, one has to fly a true air-circle, and not turn round a stationary spot on the ground. Where to find thermals is a matter of experience allied to general knowledge of the air and its ways. The main instrument of the glider pilot is the variometer, which is an extra-sensitive version of the rate-of-climb indicator used in powered aircraft. Gliding, like power-flying, is becoming more and more a matter of instrument flying, and less a matter of "feel." When blind-flying in cloud, many pilots who have trained *ab initio* on sailplanes find it possible to fly accurately for long periods on the simple turn-and-bank indicator, carrying out quite complicated evolutions in search of the best lift. The extra weight and expense of an artificial horizon must be avoided if possible. In this field therefore, the expert glider pilot probably attains a higher degree of skill than his opposite number in an aeroplane, and this is one of the points under (4) above which might bear profitable investigation.

Another such field of course is in the knowledge acquired in such cloud-flying of the structure of gusts and up-and-down-currents to be expected inside cumulo-nimbus clouds and of their icing and electric characteristics. The more a pilot can get on what I might call intimate terms with these million horse-power monsters, the less likely is he to be caught out by them.

Wave-lift. Although standing-waves have been explored by glider pilots now for nearly 20 years, they have only recently come into the knowledge of most power pilots, as a result of one or more accidents which have been traced to flying unawares into the descending area of a wave system.

Of course dozens, possibly hundreds, of fatal accidents have happened to aeroplanes in the history of flight from this cause, but only recently has the cause itself been "discovered." This is another instance of the surprising lack of interest in the discoveries of the ways of the air which have been made by glider pilots.

When air is "stable," it behaves much like water. If one observes a weir in a river, one can see that downstream of the base of the waterfall itself the water usually humps itself up into one or more "standing-waves." These standing waves run parallel to the line of the foot of the waterfall, and are stationary in relation to the banks of the river, the water flowing through them.

Stable air pouring down a ridge of hills or mountains also humps itself up downstream; but whereas in water the standing waves are quite low, owing to the discontinuity between the water and the air above it, there is no such limiting boundary in the case of the air wave which can accordingly imprint itself on the air above it to the startling altitudes discussed above. The technique of climbing in a standing wave is therefore the reverse of that needed for a thermal. The aircraft, once in the upcurrent, is pointed into wind and flown at the same speed as the wind at its level, so as to keep it more or less stationary in relation to the ground.

A wave is often marked at several levels by the formation of "lenticular" clouds, stationary clouds with a lens-shaped cross-section, and these clouds seem similar to a type of cloud named "mother-of-pearl" clouds which have been observed at altitudes of around 120,000 ft.

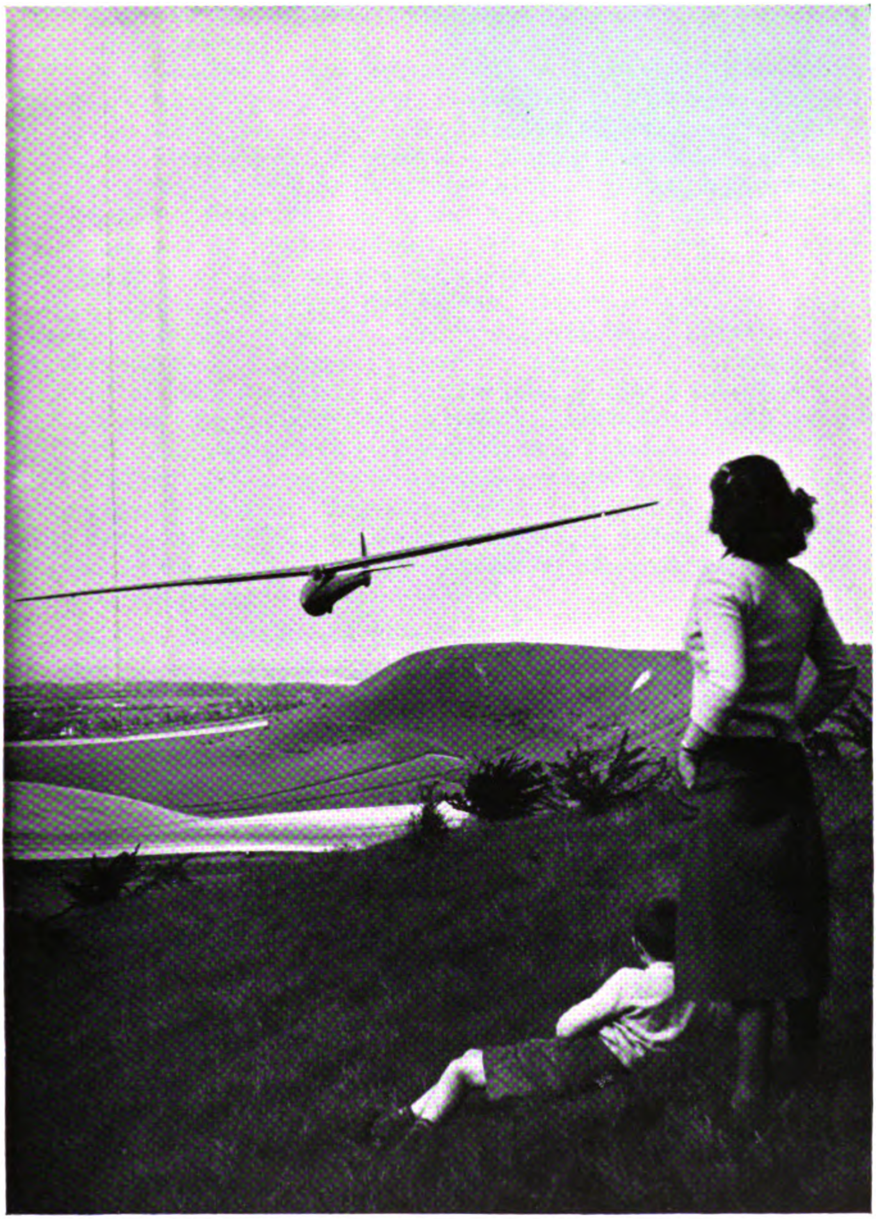
An exploration of the Bishop Wave in California by gliders is being financed by the U.S. Government, and it was during one of the flights made in the course of this investigation that the height record mentioned above was achieved. This of course is one of the fields under point (5) mentioned at the beginning of this article.

A wave system can cover a very large area, and hence the down-current side of each wave can be large enough to form a hazard to the unwary power-pilot, flying possibly in cloud or at night over mountainous country. A surprising feature of waves, which undoubtedly has caused some of the trouble in the past, is the extraordinary smoothness of the air in them. Only by watching his instruments can the pilot have the least idea as to whether he is climbing or descending. In a vibrationless sailplane, this very lack of any air movements is itself so marked that the experienced pilot can immediately suspect a wave, and alter his flying technique accordingly. Here again therefore, is a field in which a power pilot, through sailplane experience, can attain a more intimate knowledge of the air than in any other way.

What have sailplane designers to say which might be of value to their powered aircraft brethren? This particular branch of design has recently been dubbed the science of "low-loss aerodynamics." Few will argue against the view that aeroplane designers have often found it easier to substitute brute force for brains. If they want an aeroplane to go faster, it is the easiest way out to instal in it another 100, or 1,000 horsepower. The sailplane designer has no such easy way out. His motive power is gravity. A modern high-performance sailplane of ordinary design, weighing say 825 lb. all up, needs to extract 3 h.p. from the atmosphere to enable it to maintain height. The smallest refinement, such as the suppression of external pitot-head, is all gain. A careful test was recently made comparing the performance of a sailplane fitted with the usual simple skid landing gear and the same aircraft modified with a small single landing-wheel recessed into the skid. The performance of the modified aircraft was no less than 10 per cent. worse, that is, the small portion of wheel protruding and the wheel-well absorbed about 0·3 h.p. at minimum sinking speed, about 40 m.p.h., and of course more at higher speeds.

For a period during the war, our fighter aircraft were finished with a rough matt black paint, a sight which was anathema to any sailplane pilot. Eventually a smooth finish was substituted, and I believe top-speeds were increased thereby by the order of 10 m.p.h.; whilst range and maximum altitudes must also have been improved. I do not like to try to calculate the horse-power which must have been absorbed in dragging that matt paint through the air at high speeds.

Anyone versed in the economics of commercial aviation will be still more aware of the value in pounds shillings and pence of such an approach to design matters. It was Heinkel, with his background of sailplane design, who insisted before the war that his military aircraft should have flush-rivets, thereby giving them a refinement which others did not have until many years later. Flush rivets might easily increase the income of an airline by £50,000 per annum; they might make the difference between



Slingsby Sky Sailplane, the type flown by Mr. Philip Wills when winning the World Gliding Championship at Madrid in 1952

overtaking your opponent or him overtaking you. But they are a bit of a bother to incorporate.

Of course the best modern designers are now thoroughly drag-conscious: one cannot see many unnecessary excrescences on a Comet. But some might still benefit from the inborne approach of the designer of sailplanes.

Sailplane design is on the verge of producing a dramatic leap forward in performance of much the same order as powered aircraft underwent in the transition from stick-and-string to retractable undercarts, V.P. propellors, and the rest in the early 1930's, or the current change from reciprocating to turbine engines now under way.

By using wings of laminar-flow section, performances will be improved by as much as 30 per cent. Already the R.J.5 mentioned above has shown the way, but the cost of construction of this experimental prototype makes it more a scientific tool than a practical sailplane. The prize will go to the first designer who discovers a way of building wings of sufficiently accurate profile to achieve good laminar characteristics at a reasonable cost. It is at least likely that this method will have some application to powered aircraft, whether success is achieved in metal, plastics or even in wood.

At this point it may be of interest to record the various stages through which a glider pilot progresses. The British requirements for the first three certificates are:

"A"—a straight glide of 30 seconds duration.
"B"—two glides of 45 seconds followed by a flight of one minute including an S turn, or by one right-hand and one left-hand circuit each of one minute's duration.
"C"—a soaring flight of 5 minutes carried out above the altitude of launch.

The present Air Training Cadet scheme aims to bring all pupils to the "B"stage, and has recently been extended to allow an exceptional pupil to achieve his "C."

The next steps are the achievement of International Badges.

The "Silver C" involves passing three tests: a duration flight of five hours; a flight of a minimum distance of 50 kilometres, and a gain of height of at least 1,000 metres.

The "Gold C" requires a flight of 5 hours (if the pilot has already a Silver C his duration flight for this badge will suffice); a distance flight of 300 kilometres; and a climb of 3,000 metres.

Finally come the three Diamonds. A pilot can add a Diamond to his Gold C for each of the following achievements: a flight of at least 300 kilometres to a goal declared before take-off; a climb of 5,000 metres; and a distance flight of 500 kilometres.

There are at present only about half a dozen sailplane pilots in the World with the three Diamonds. Three British pilots have gained two, but the 500 kilometre flight is hardly possible in our small island, and no-one has yet had the chance to attempt it in suitable conditions in some larger country overseas.

But of course British weather is greatly inferior to nearly everyone else's, so that a comparison of the number of International Badges gained in each nation is not necessarily a comparison of their relative average skill. A better comparison can be made by the results of World Gliding

Championships, where pilots of all nations fly against each other on set tasks over a period of several days.

Here, after many years' efforts, we came out on top in 1952, when flying against 18 other nations, in a field of 39 single-seaters. We gained 1st, 3rd, 9th, and 11th places, and other competitors flying British aircraft came in 4th, 7th, and 14th. By the time this article appears, the 1954 World Championships, held at Camphill in Derbyshire, will have been decided. Whether we shall have won or not, I hope and believe we shall have put up a good show.

Finally, I come to where I believe lies the greatest potential value of gliding. It will perhaps be the most difficult goal of all to achieve, because it involves attacking vested interests, and altering the irrational minds of men.

What is the real meaning of that dreadful word "airmindedness" and is it a really desirable thing to achieve?

The British nation made a name for itself on the sea. For centuries we say we "have had the sea in our blood." Parents feel proud if their children elect the sea as a career. To go sailing for a hobby is considered an admirable thing. There are no restrictions, no licences, no Certificates of Seaworthiness required. Neither the Royal Navy nor the Merchant Navy attempt to say that the sea should be kept clear of stupid amateurs. Complicated apparatus, whose price has not been tripled by governmental control, can even be bought by anyone to enable them to swim at surprising depths underwater, in surroundings that many of us will feel are far more potentially alien to human survival than is the air.

We are, in fact, sea-minded. Anyone is encouraged personally to adventure on the sea. We have got used to the idea of it, it is a perfectly natural medium.

But the air has only come into our ken during the last 50 years. It has been built up by the popular Press, by the cinema, and by the thousands of folk who make their living out of creating the restrictions surrounding it today, as an inherently unnatural, dangerous, and incomprehensible medium. And quite insufficient distinction has been made between the controls needed to safeguard commercial and service aviation and the very minimum needed for sporting flying. So long as a private pilot is not allowed to risk anyone else's life, why should he be prevented from risking his own any more than is the mountaineer, the underwater swimmer, or any other amateur sportsman?

It is of course because controls increase costs that the ordinary man has been to all intents and purposes frozen out of the air; except in the case of gliding, but even here the lack of government support restricts the size of our movements to a fraction of what it could, and should be. The requirements for a power "A" licence have been so stepped up that it now needs an outlay of at least £120 to acquire it. This of course is equivalent to killing the Light Aeroplane movement.

With such an attitude to the air built up around it, is it any wonder that we seem constantly to be worried over shortage of recruits for our civil and military flying services? With reasonable support, through gliding we could provide a personal experience of the air to everyone of all ages and both sexes who wished it, and at a reasonable cost—we could make people "air-minded." It will be agreed we are "sea-minded." Have our

Merchant Navy or the Royal Navy ever experienced a constant shortage of volunteers, in war or in peace? Through gliding, Germany made her people air-minded, a characteristic they have apparently retained through the reverses of the recent years. I am not aware that the Luftwaffe was ever short of recruits, nor do I think that if and when it is regenerated it will find itself so.

I once made a perfectly normal landing in a field after a cross-country flight. Two girls came running up to see the fun, and as they arrived, seeing me emerge apparently unruffled from the cockpit, one turned to the other and said: "Coo! Ain't he brave?" If the ordinary person's reaction to flying remains on this level, we shall become, in terms of the future, a second-class nation.

PHILIP WILLS

CHAPTER XXII

COMPULSORY SERVICE IN THE ARMED FORCES

BY MAJOR F. L. LEE

FOR THE past seven years National Service has been endlessly discussed in countless British homes and many think that it is rather tough on the younger generation. If two years training in the armed forces preserves peace, these young men will indeed be fortunate, for their fathers and grandfathers fought two bloody wars because of their country's unpreparedness.

The sea, which has proved so sure a protection of our shores, had lulled us into a false sense of security. We did not begin to prepare for war until the guns began to fire. In the Great War we paid a fearful price for this, and in the last war, escaped annihilation only by a miracle. Have we forgotten the slender margin between victory and defeat ?

Britain had learned to regard war as merely an expensive necessity of equipping and dispatching abroad an expedition. If successful, there were spoils, and failure did not imperil the safety of the Kingdom; the Navy insured that. Since an adequate defence programme to meet threats from Europe involved vast expenditure and sacrifice, the people would not stand for it in peace-time. The sea gave Britain a sense of safety; she was not like a continental country where the enemy might march over the frontier in the night and she had not, for nine hundred years, experienced the horrors of enemy occupation. It therefore came as a stupefying shock to the British people, in the Summer of 1940, that it was well within the the bounds of possibility that before the Autumn leaves had fallen, they might find themselves in concentration camps and undergoing forced labour, with nothing to look forward to but an existence depending on the mercy of those whose methods we later had an ample opportunity of observing.

Britain will not take this risk again as is evident from the introduction of universal service in the armed forces in peace. The original idea was to create a large reservoir of trained men, but as the so-called cold war persists, the primary object now is to maintain the strength of the active army. For instance, the army today comprises approximately 180,000 regulars and 214,000 national servicemen.

CONSCRIPTION IN KING ALFRED'S TIME

Compulsory service in the forces is not a modern innovation; it existed in Saxon times. It is recorded that King Alfred by prudent administration made all the subjects of his dominion soldiers. He divided the country into military districts and obliged every five hides of land to provide an armed man, with victuals and pay, at the King's summons, to serve for two months in a year. The owners of five hides of land and upwards were required to do thane's service, that is, to appear on the field as heavily armed men, at their own charge, and serve the whole campaign. A thane wore a shirt of chain mail, conical helmet with bar protecting the nose, and legs swathed in bandages with arms free to swing the Danish axe. He was also obliged to possess a sword, shield, and five missile darts. Lightly armed men carried only a shield and spear.

THE ANCIENT FYRD OR GENERAL LEVY

This force, called the Fyrd, gave the Earls, who led it, too great and independent power. Earl Harold took advantage of this to seize the throne on the death of Edward the Confessor to the exclusion of Edgar Atheling, the rightful heir. King Canute had established a royal bodyguard by retaining six thousand men of the Danish army before sending it home, and thus established the first regular army in England. With these Danes and the raw levies of the Fyrd, Harold hurried from his war in the north to meet the Norman invaders at Hastings.

CONSCRIPTS AT THE BATTLE OF HASTINGS

Harold showed remarkably sound judgement in his appreciation of the situation which confronted him in opposing the well trained and well armed Normans with the inexperienced and half-armed men at his disposal, many of whom carried only farm implements as weapons. He formed up his force on well chosen ground in columns of wedges, with the simple order: to hold the ground. The Normans came on with great dash and confidence but were repeatedly hurled back. The English fought doggedly and fiercely; a Norman knight had his charger almost split in two by a mighty blow with a heavy axe. William of Normandy, also an able commander, was quick to appreciate the futility of running his head against a brick wall, and ordered his troops, if again repulsed, to simulate flight. His strategem succeeded; the English with loud shouts, broke formation, against orders, and went in pursuit. The wily William was thus enabled to turn a doubtful or losing battle into victory. Thus William of Normandy became William the Conqueror of England, not because of lack of courage or endurance of the defeated, but because of the besetting national sin of military unpreparedness.

It is interesting to compare the situation which confronted Harold at Hastings with that of the British Expeditionary Force in France in May, 1940. Harold would certainly not have committed a force inferior in armour, arms, training and all else in the art of war save courage, to open warfare in Belgium with the powerful German Panzer Divisions. He would have defended the prepared line on the Franco-Belgium frontier. Whatever reverses might follow could not amount to a fraction of the colossal disaster which led to Dunkirk.

FEUDAL LEVY

William the Conqueror quickly established the feudal system in England. This was tenure of land from the King subject to obligations of fealty and military service. This created a territorial relation with the Crown in which the king was lord of every man and immediate lord of the great. William divided the country for military purposes into 60,000 knight's fees, called tenants in chivalry. Each knight's fee was bound to provide a knight to attend the king in his wars for forty days in each year. The king, therefore, had at his summons 60,000 armed men without expense to himself.

MERCENARIES—SCUTAGE

William Rufus improved on this by requiring each man to be provided with ten shillings conduct money. He called on this force three times and on the last occasion on which he issued the royal summons, he met his army, 20,000 strong, at the rendezvous, relieved them of their money and dismissed them to their homes, thus providing himself with two hundred thousand shillings which enabled him to hire foreign mercenaries.

Henry the Second regularised this practice by accepting a money payment in lieu of personal military service. This was called scutage and enabled the king to take mercenaries permanently into his pay. When a larger force was needed, one knight in every three was called upon to serve.

ASSIZE OF ARMS AND NATIONAL MILITIA

By the Assize of Arms—the earliest enactment dealing with the national forces—Henry the Second re-established the old English Fyrd as a national Militia and provided in detail for the arms to be carried by each man according to his rank. In addition, the whole community of freemen was required to possess certain military equipment. The Assize of Arms was later adopted by the Statute of Winchester in the reign of Edward the First, which required every man according to his estate and degree to possess a determinate quantity of such arms as were then in use.

COMMISSIONS OF ARRAY

This measure was for defensive purposes and did not satisfy the kings, who wanted a force available at once, anywhere, for any length of time. The liability for military service thus established was used as a means of collecting a force, sometimes under Commissioners of Array, not merely to resist invasion from Scotland, but for foreign wars. This was frequently done by Edward the First, who paid the levies for their services, and by Edward the Second, who threw the charge on the countries from whence the men came. This practice was declared illegal by a series of Statutes from 1349 to 1402 and the law was then made clear: "that no man should be constrained to find men-at-arms or archers unless he held his lands on the terms of such service, or else by the force of grant and assent by parliament, and that no man could be required to serve out of his country except in case of invasion, and that volunteers who served the king abroad should do so at the king's charge."

King Henry the Fifth hired his own troops and supplemented his force by those supplied by certain lords under indenture with the king. Yorkist and Tudor kings used the pretext of invasion from Scotland to send Commissioners of Array into the counties and call on men to serve without consent of Parliament, or payment.

CHARLES AND THE LONG PARLIAMENT

In his Northern Campaign, Charles the First used Commissioners of Array to the great displeasure of parliament. The king asserted that such power was part of the royal prerogative and that all powers over the militia inherently resided in the Sovereign. The long parliament contended that, being unsupported by statute and claimed only on the grounds of immemorial usage, the exercise of such powers by the king was unlawful. Both houses of parliament denied the royal prerogative, which was a decision of doubtful legality, but seizing into their own hands the entire control of the militia, was certainly illegal. This at length became one of the main causes of the fatal rupture between king and parliament.

BILL OF RIGHTS AND THE ARMY

The Bill of Rights 1689 declared that the raising or keeping of a standing army in time of peace, except with the consent of parliament, was illegal. The result was that no departure from the ordinary law in enforcing discipline in the army would be lawful, and no supplies for the maintenance of the forces would be available, without an Act of Parliament. The Army and Air Force are now maintained under the Army Act 1881 and Air Force Act 1917, which provided a code of military law, and these Acts are brought into force, and if necessary amended, annually by the Army and Air Force (Annual) Act.

THE NAVY AND PARLIAMENT

The different treatment which the Navy has received at the hands of Parliament is largely due to historical reasons. A Navy has always been deemed essential to the safety of the country, and unlike the Army, never came under the suspicion of Parliament, for the Navy was never used by the King to coerce Parliament. And so it was not included in the prohibition against the maintenance of a standing Army in time of peace. Whereas the existence of a standing Army has to be legalised by an Annual Army Act, the Navy has remained a prerogative force, maintained on a permanent footing, subject to the Naval Discipline Acts, which are permanent Acts. In point of fact, Parliament has acquired as much power over the Navy as over the Army, since both depend for their existence upon an annual Parliamentary vote of supply. There is also an historic difference in the power to impress men into the services. The right of the Crown to force men into the service of the Army was denied by statute as far back as 1327, whereas the impressment of seamen into the Navy has never been declared unlawful by statute and in fact has been supported by continued usage for centuries, by express judicial opinion and by the implied sanction of numerous statutes. This power has often been disputed on the ground that, as it is not supported by statute, it is a violation of Magna Carta and an invasion of the liberty of the subject. But a practice grounded on immemorial usage, not inconsistent with any statute, nor repugnant to the public benefit, is as much part of the law of England as statute law.

—Paul—and the remnant of her crew of two hundred were taken in a fight which might easily have gone otherwise were it not for the dogged determination to fight to the last.

Another instance is the glorious action of the Monmouth, 64 guns, against the powerful, 84 gun Foudroyant in the Mediterranean in 1757. French ships sighting Admiral Osborn's squadron, turned and fled. The Monmouth was in the van nearest to the French and regardless of his ship's inferiority, Captain Gardiner crammed on every stitch of canvas and went in pursuit of the leader Foudroyant sailing before the wind. The chase began at dawn and went on all day, the French ship using only her stern guns, as she would not risk the loss of distance by sheering to facilitate a broadside. The Monmouth took a lot of punishment but never wavered. Captain Gardiner had his arm shattered by a musket ball but never left his place, saying to Lieutenant Carkett: "It matters nothing what happens to you or me; that ship must go into Gibraltar." About dusk grape shot from the Monmouth began to tear through the rigging of the French ship, and the fight grew closer. Muzzle to muzzle the guns blazed away far into the night. The gallant Captain Gardiner was struck down by a deep wound in the head. As he lay in his blood on the quarter deck, his whispered orders to Carkett were: ". . . closer, closer, lay on her quarter, never give up, never strike, . . . promise, . . ." Carkett carried out his dying captain's order with resolution, and the ships lay yard-arm to yard-arm, blazing away by the light of the moon. When the Swiftsure and Hampton Court (Captain Hervey) arrived, they found both ships drifting wrecks, but the colours of the French ship lay over her taffrail and the colours of the Monmouth flew proudly aloft. The French Captain, du Quesney, refused to deliver up his sword to any but the gallant captain of the Monmouth. Alas, this was not to be as Captain Gardiner lay dead at his post, his task accomplished in accordance with the traditions and standards of the Royal Navy.

RECRUITMENT IN THE 18TH CENTURY

Since the Bill of Rights, the army seems to have been little more than an *ad hoc* force for the particular campaign on hand. The Mutiny Act 1703 empowered the Queen to release from gaol capital offenders on condition of enlistment. Strangely enough these men were in great demand because, of course, many of them were sentenced for trivial offences. Later, insolvent debtors were released on similar conditions, but as many of them were infirm and elderly, they were permitted to find deputies. Thus many fine young men came forward to take the places of fathers or relations. To meet further demands for recruits, Justices of the Peace were empowered to levy as recruits all able-bodied men who had no employment or visible means of support, for which a bounty was allowed to the parish officer. The disaster of Almanza created a desperate need for twenty thousand recruits. The authority to impress men of no employment was transferred to the commissioners of land-tax and the bounty to the parish was increased to £3 for each recruit. Volunteers were offered a substantial bounty and could enlist for three years which was an innovation.

Men hated most service in the colonies. Most hardened criminals could hope for pardon if they volunteered to serve in Jamaica. Men shipped to the West Indies were soon forgotten; little or no provision was made for pay or clothing and troops in Jamaica were often reduced to nakedness and starvation. A company destined for service in Newfoundland had to have its destination concealed from the men or they would have fought for their liberty.

GERMAN TROOPS

In 1756 the country was in fear of a French invasion. Holland was asked for troops that she was bound by treaty to furnish, but refused. A Royal message was sent to Parliament to the effect that the King, in the present peril, had sent for his Hessian troops from Germany for the defence of the country. At first there was some pompous opposition, but the House soon swallowed its pride and in the end carried a motion by three to one to bring over Hessians *and* Hanoverians to defend England who could not defend herself. This however stung the House to activity and an Act was passed providing for men to be chosen by lot in every county in England and Wales to serve for three years for home defence.

FENCIBLES

Our soldiers were scattered over many parts of the world and there was a constant need for replacements. In order to release more of the regular army for service abroad, a new corps—the Fencibles—was raised. These were regular troops for service at home only, though some regiments volunteered for service on the continent. The regiment of Ancient Irish Fencibles even got as far away as Egypt. There were also Fencibles raised for certain places abroad, for instance, Skinner's Regiment of Fencibles for service in Newfoundland and North America. Besides this, there were invalid companies for service at home and abroad, also Militia, Provisional Cavalry, Yeomanry, Volunteer Associations of Cavalry and Infantry, as well as a standing contract for the supply of Hessians and Hanoverians. In addition to all these, British Agents on the continent were authorised to raise regiments of French, German, Dutch, Swiss, Corsicans, Minorquins, and Maltese, with occasional infusions of Austrians, Italians, and Greeks.

This was an impossible mixture and at the beginning of the nineteenth century, Lord Castlereagh made praiseworthy efforts to do away with this chaos by establishing a system of national training for the land forces. His aim was that every able-bodied man between the ages of eighteen and thirty should be compelled, as a national duty, to learn the use of arms. Men who obtained a certificate of efficiency after a period of training were exempt for three years and were then tested again. Men without certificates were to muster every six months in their parishes and were fined if inefficient; the fine to be increased every six months until satisfying an Inspector. From men so trained, were drawn by ballot, recruits for a local Militia who served for three years, and might be called on a second time in their turn.

Unfortunately all these provisions were not passed by Parliament. Substitution was permitted as in the regular Militia, with the result that trained men were re-enlisted in substitution of those who avoided national service by the prolonged service of others, and so the principle of universal training was defeated.

WELLINGTON'S ARMY AT WATERLOO

The shadow of a French invasion deepened over Britain with the rise of Napoleon. The efforts of Parliament to meet the threatened danger can best be judged by the strange assortment of troops made available to the Duke of Wellington when he went forth to meet Napoleon at Waterloo. Of the 63,000 men present at Waterloo, only one-third were British. The Duke's force was as follows:

British	21,000
The King's German Legion ..	5,000
Hanoverians	11,000
Brunswickers	5,500
Nassauers	3,500
Netherlanders	17,000
	63,000

WARS THROUGHOUT THE 19TH CENTURY

On the fall of Napoleon it was reasonable to expect a long period of peace, but this was not to be. Britain was quickly involved in war again, and a succession of wars went on throughout the century ; the British Army was fighting all over the world. The Nepal campaign in 1814 was followed by the Pindari War, war in Ceylon and Burma and the Crimean war in 1854. This was the first major war for which the Navy did not impress men for service. Impressment was not then declared illegal but was said to be impracticable.

The Crimean war, from which Britain got precious little else than names for an overcoat, jacket, and helmet, was barely finished when Britain was at war with Persia, followed by the Indian Mutiny. Then came war with China, Abyssinia, and the Maoris in New Zealand. Thus Britain attracted much international unpopularity which has never fully abated. The unfortunate Boer War, in the first year of which the British Army was nearly swept into the sea by the Boer farmers, attracted world-wide attention which focused on our military weakness. In this case, the man-power was plentiful and good but the faults lay with the leaders and staff. Weakness bred insecurity and German Militarism was encouraged by our poor showing in South Africa. Lord Roberts, Mr. Amery and others appreciated the danger from Germany and called for universal military service. This was met with the usual nonsense: one volunteer is worth half-a-dozen conscripts. We know that an untrained man, volunteer or conscript, is useless in the Forces in war. As the science of war develops, the period of basic training becomes longer.

A WAR TO END WARS

When the Great War burst on Britain, we had little notion what to expect in a modern continental war. We sent four divisions and cavalry to

France and began to collect a few more divisions from all over the world. Sir John French, Commander-in-Chief, was of opinion that the war would be over by Christmas 1914. Our plans for raising an army rested on recruiting meetings, bands, and posters, which could not have been better designed to skim off the cream of the country's manhood. In the meantime, the regular army was left to bear the burden and thus the nation was drained of her professional military leaders and instructors. Wounded men were patched up and quickly returned to the front while fit young men were free to go about their normal life at home. At Easter, 1915, the British Expeditionary Force was asked to stop leave from the front so as not to interfere with the Easter rush to holiday resorts at home. It is obvious that the Country had no notion that the war was a matter of national life or death and totally unlike Empire-building wars in which she had so frequently engaged. Meanwhile, our small regular army was left to battle on as best it could in the mud of Flanders, short of reinforcements and ammunition. A serious shortage of ammunition restricted the field artillery to a few rounds a day and often the artillery was forced to turn a deaf ear to the calls from the infantry for support and retaliation. That such a shortage should be felt in early 1915 is clear proof that the authorities could have had no conception of the requirements of a European war.

CONSCRIPTION IN THE GREAT WAR

It was not until 1916 that an Act was passed which declared that every male British subject between the ages of 18 and 41 was deemed to have been enlisted in the army and transferred to the reserve, but exempting married men and widowers with dependent children. This measure came too late to be of great value, as it was impossible to digest the vast numbers which thereby became available. This is evident from the fact that young men of good physique were still working as clerks in Government offices as late as the summer of 1917—three years after the War began.

Towards the end of the Great War, Lloyd George declared that it was a war to end wars. One need only turn back the pages of history to learn that man is a vicious, quarrelsome creature; that war has gone on unceasingly in the world; and there is no reason to doubt that man will fight his fellow man until the end of time. And so Europe was left in peace only for a short time. In the early 1930's it was plain that the rise of dictators in Germany and Italy made war probable. If there were any doubts, the failure of Mr. Chamberlain's efforts should have dispelled them.

In May, 1939, the Military Training Act was passed. This applied generally to male British subjects between the ages of 20 and 21 and made them liable to undergo training in the armed forces of the Crown. At the same time provision was made for calling out the reserve and auxiliary forces. War clouds were blowing up fast and on 3rd September, 1939, was passed the National Service (Armed Forces) Act—for the compulsory service in the armed forces of all male British subjects aged 18 to 40. In 1941 the liability for service was made to include service in Civil Defence. In spite of the lesson of the Great War and threats from Hitler over many years, Britain was again caught unprepared. Even the merciful respite of the period of the "phoney war" was insufficient to make good the false economy of the 1930's which left a woeful deficiency in modern war material and trained men to use it.

The colossal disaster which befell the British Army in 1940 shook the Empire to its foundations. The world looked on in awe, expecting to witness the mighty Britain crash at the feet of a conqueror. They heard a voice offering the people "blood, toil, tears and sweat." The response from the people was never in doubt. And thus a great Englishman touched that part of the British character about which foreigners know nothing.

NATIONAL SERVICE

There has been much discussion about National Service and it is often drawn into party politics. There are no politics where the safety of the State is concerned, and this has been loyally followed by *statesmen* of every party. Further, there is no choice in the matter; as long as world tension exists we must not relax. The Service chiefs will require large numbers of trained men when an emergency arises. There is then no time to train raw recruits in the use of complicated instruments and weapons. The Government, therefore, brought into force a scheme of National Service which will build up a reservoir of trained men ready to play their part should their country require their services.

Under the National Service Acts 1948 to 1950 every male British subject ordinarily resident in Great Britain, on attaining the age of 18 years, or who has not reached the age of 26 years on January 1, 1949, became liable to be called up to serve in the armed forces of the Crown for two terms of service as follows:

(*a*) A term of whole-time service in the Regular Forces of two years and

(*b*) A term of part-time service in the Auxiliary Forces of three years and six months.

This measure was for a period of five years and has since been extended by Parliament for a further five to January 1, 1959.

The considerations confronting a young man about to be called up are two: national and private. The first is a duty to the Crown to become a useful and efficient member of the Forces. There is a modern tendency to expect a lot from the state without giving anything in return; obligations to the Nation are not discharged by flags and bunting, but in the case of a National Serviceman, by two years' willing service to his Queen and Country.

The personal considerations are more fluid and leave a lot to the good sense of the National Serviceman. He should regard his time in the Forces as a golden opportunity to benefit himself in many ways. At first it will seem hard to leave home surroundings, but he should learn to appreciate the benefit of association with others on a common footing. To lengthen the hiatus between a mother's apron strings and a wife's dominion is no disadvantage. Men at universities gain as much from association with their colleagues as from attendance at lectures; education does not consist only of the branches of knowledge for which examinations are set.

EDUCATION

During his term of service, the National Serviceman has a fine opportunity of improving his education. Besides the compulsory education he may be required to undergo, there are voluntary classes on a wide range of subjects. The Educational Branch in each Service provides excellent facilities for men who have the good sense to make use of them.

Each year more Servicemen are studying and taking examinations, mostly the General Certificate of Education under arrangement with Cambridge University Local Examination Syndicate, and the results are very satisfactory. In the July, 1953, examination, 1,068 candidates from the Forces took part and 731 obtained a pass in one or more subjects. At the December examination following, 1,052 were successful out of 1,678 candidates.

PROMOTION

National Servicemen are eligible for promotion in the same way as in the Regular Forces except that promotion by length of service does not apply. There is also a system in the Army of awarding "stars," one to six, which are earned for proficiency and carry extra pay.

Potential officers are selected at the Basic Training or Selection Unit, and in the Army, selected men attend a War Office Selection Board, and if accepted, are posted to an All Arms Cadet School; those who pass out successfully are granted commissions in the Land Forces. There are about 5,000 National Service Officers in the Army.

SPORT AND TRAVEL

The Services provide excellent facilities for games and for training for boxing, running, and gymnastics and all athletic sports, and experts are usually available to help and advise men who are keen to learn or improve.

The opportunity to serve abroad comes to many National Servicemen. They are better off than their regular colleagues because their short term of service curtails the duration of service overseas. Men serving in Germany, Austria, and Tripoli may have the chance of visiting excellent leave centres and taking part in Winter Sports.

LEAVE

Leave of absence in the Services is very generous, and the first leave is usually granted after finishing basic training, and thereafter, seven to fourteen days is granted throughout a man's service. This is in addition to weekend leave and embarkation leave if posted abroad. National Servicemen are also eligible for four free travelling warrants during their term of service.

PARENTS AND NATIONAL SERVICE

It is of great importance that parents of National Servicemen should appreciate that a term of service in the Forces is capable of benefiting their sons. The attitude of parents to National Service speedily infects their sons and it would be unfortunate if the young National Serviceman starts off, psychologically, on the wrong foot. This is a critical time in his development and calls for parental encouragement so that whatever success he achieves he will proudly feel it is shared by those at home.

THE SERVICES AND THE NATIONAL SERVICEMAN

An average of 300,000 men register for National Service each year. The services have a vast responsibility in handling such a large part of the young manhood of the Nation. Such an opportunity has never occurred before in our history and the services should be alive to the unique. opportunity of benefiting the Nation in a wider field than training for war.

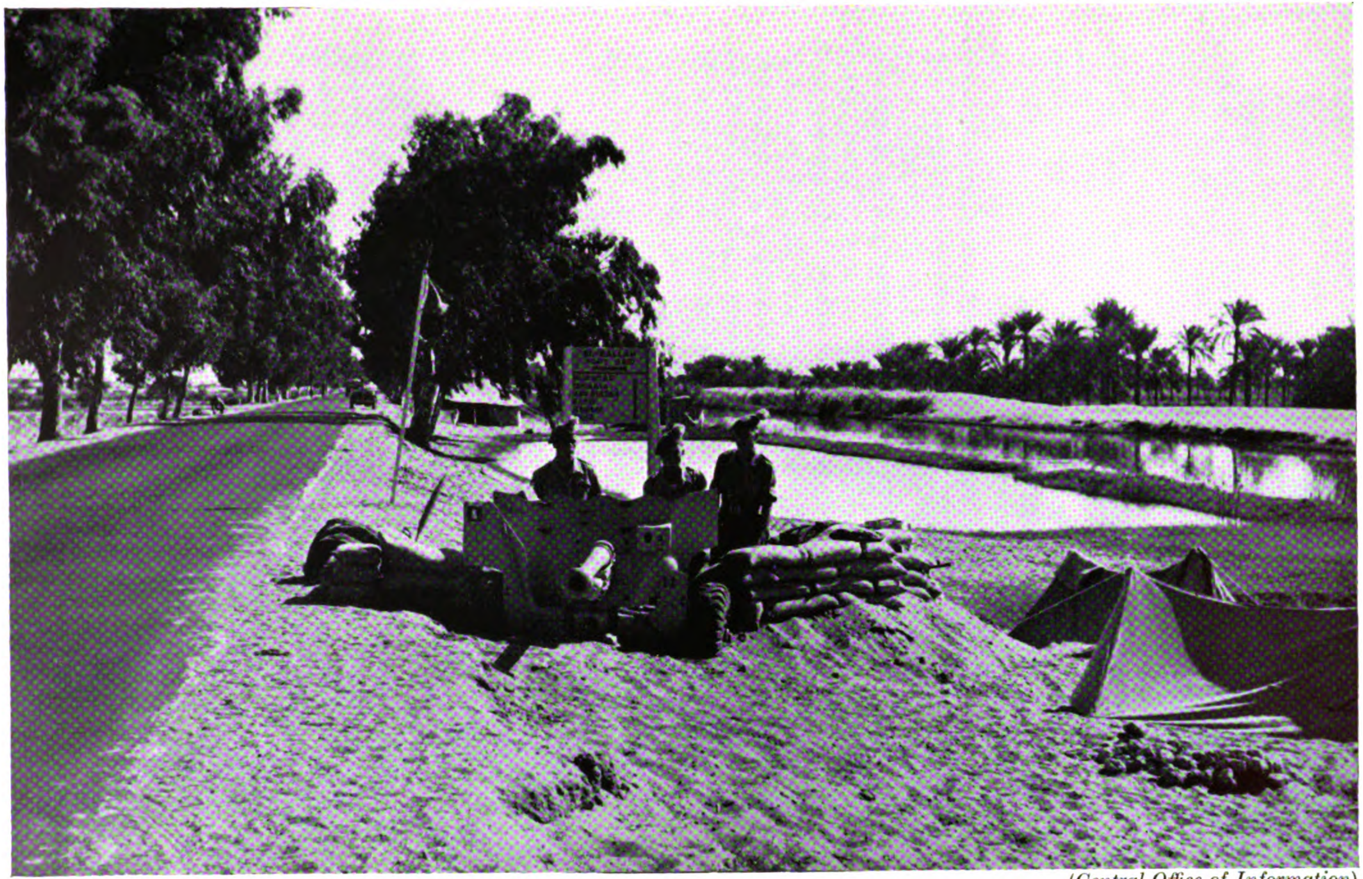
The majority of these men pass into the Army and in course of time a couple of million men will have undergone a period of military service. The methods of dealing with these young men should be constantly under review and brought up to date in the light of modern experience. Traditionally, the War Office is indifferent to new ideas and it is often said in jest that the Army is always busy training for the last war. In the past the Military authorities were notorious for resisting reform. For instance, the muskets used in the Crimean War were of the same pattern as those carried at Waterloo; and the waterbottles similar to those in use by the troops under Marlborough. About 1860, when the latest drill book was consulted, it was found to be dated 1788. At that time there were on the Active List of the Army thirteen Generals each of whom had 70 years, or more, service. Even the officer who led the charge of the light Brigade at Balaclava, Lord Cardigan, was in his 58th year at the time. In the Great War the Army persisted in the use of shrapnel shells long after it was obvious that they were obsolete and useless, and well into the war, the authorities stubbornly adhered to their faith in Cavalry. At the Battle of Arras in 1917, when the German front system was overrun, cavalry were sent through on the open ground south of the river Scarpe. A couple of German machine guns firing from loopholes in buildings at the outskirts of the village of Moncley-le-Preux rapidly annihilated a splendid body of men and fine horses; it was a tragedy which many foresaw was bound to happen.

There is no doubt that the science and art of War is in the melting pot; old ideas, and perhaps principles, must be examined and scrapped if necessary. Brawn has given place to brain and the new ideas should be reflected in the training of National Servicemen.

Perhaps the time has come to scrap the infantile competition in spit and polish. It is harmless in moderation but has been grossly overdone in the past. It is an insult to intelligence to require the burnishing of some odd item of barrack-furniture as a demonstration of the efficiency of a section or unit.

The cost of National Service is enormous, but it may prove an investment yielding good dividends if two or three million men return to civil life finer men and better citizens. If this is achieved, it may act as a much needed blood transfusion to a Nation which has endured and withstood tremendous, almost mortal, blows during the past forty years.

F. L. Lee



(*Central Office of Information*)

Egypt. British troops manning a gun covering a road leading into the Canal Zone

CHAPTER XXIII

ENTRY AND TRAINING OF NAVAL OFFICERS

By Rear-Admiral H. G. Thursfield

For a century past, the system of entry and training of officers for the Navy has been the shuttlecock of successive Boards of Admiralty. The age of entry has been juggled up and down; the length of their preliminary training has been lengthened and shortened and the methods adopted in it have changed continually; sometimes naval cadets have been sent to a stationary hulk or, later, a college on shore; sometimes to a sea-going training ship; sometimes to a combination of the two. The officers of some branches have been subjected to this kaleidoscopic system; the officers of others have sometimes been sent straight to sea-going ships on entry, sometimes to a separate college for a totally different system of training and for much longer courses than the generality; sometimes officers of various branches have been entered together and separated out afterwards; sometimes separate entry from the first has been the rule. In all this welter of change and tinkering it is not easy to pick out any feature of permanence, of principle which has been maintained throughout. But there are some, certainly, to which a substantial body of naval opinion has been staunchly loyal—not altogether logically, in the opinion of others, it may be noted—which have subsisted practically throughout the period cited. One of these is early entry, at an age varying from 12½ to 16; another, which is really the result of the first, as will be seen below, has been the practice of bringing young officers ashore at the age of about 20 on the average, to undergo a series of instructional courses at shore educational and training establishments, thus interrupting their sea experience for a year or more at an early stage before they returned to the fleet as commissioned officers.

It is difficult to justify either of these two features of the system of entry and training that have lasted so long; and indeed every Committee of the many that the Admiralty appointed from time to time to examine the subject condemned them. That they have survived illustrates how powerful is sentiment in organizations that attach so much weight to tradition as do the Armed Forces, and the survival of the early age of entry is a particularly illuminating instance of that truth. The attachment of many naval officers to the system of early entry doubtless sprang in many cases from the fact that they themselves had entered young and, perhaps naturally, formed the opinion that what was good enough for them was undoubtedly good for their successors—an attitude which became almost traditional amongst admirals of the 19th century, as is illustrated by many memoirs of that age.

The tradition that no one could become a real seaman unless he went to sea at a tender age is of respectable antiquity. It was well established in the 18th century. George III wrote to Lord North in 1779 that "all the sea officers I have ever consulted as to the proper age for sending young people to sea have concurred in the opinion that 14 is as late as *so hardy a* *profession* can be embraced with the smallest chance of success." There was, indeed, some ground for King George III's conclusion, for in truth life in a man-of-war in the 18th century was hard enough. Dr. Johnson, it will be remembered, remarked that no man would be fool enough to go to sea who had contrivance to get himself into gaol. "A ship is worse than a gaol. There is, in a gaol, better air, better company, better conveniency of every kind; and a ship has the additional disadvantage of being in danger. . . . Men go to sea before they know the unhappiness of that way of life; and when they have come to know it, they cannot escape from it, because it is then too late to choose another profession. . . . When men come to like a sea life, they are not fit to live on land." Yet the hardship of life afloat in the 18th century should not be overestimated. It should be judged not by comparison with the common standards of living of our own day, but by comparison with the general standards of its own time. It may be surmised that Dr. Johnson's root-and-branch condemnation of life afloat sprang not so much from his disgust at the overcrowding and bad smells of the lower deck—which, it should be realized, were not shared by the wardroom or the cabin but were common features of the life of the lower classes in every city of his day—as from the landsman's horror of seasickness.

It is the habit of some writers today to shudder at the brutal discipline of the 18th century Navy which rested, according to them, on the cat-o'-nine-tails and nothing else; indeed it is a fact that there were some—though not very many—King's ships from time to time of which that was true. But against that it should also be remembered that the dregs of the gaols were at times swept into the Navy to help man the ships, amongst whom there were many hardened criminals who could hardly be controlled by any softer means. Yet in spite of that, there were many ships in which flogging was rare, and whose men were ready to follow their officers anywhere, in war or peace. And against the theory that only those caught young, and inured to "the unhappiness of that way of life" before they could escape from it, could acquire the skill and qualities of the sea captain, must be set the too seldom remembered facts that many of the most outstanding of them did not actually go to sea until a good deal later. Nelson and many of his contemporaries went to sea at the age of 12 or less; but equally many of them began their seafaring career substantially older. Hood, whom Nelson himself described as "the first officer in our Service," was 16. It was by no means unusual for an officer to have taken a degree at Oxford or Cambridge before going to sea; Vernon and Sir John Borlase Warren made their names in the Navy after such a start. Cochrane, an outstanding seaman and leader of seamen, was nearly 18 before he ever set foot on the deck of a ship; and many other similar examples could be quoted to disprove the legend that early entry was indispensable to the making of a sea officer.

One would have expected King George III to have included Hood amongst the sea officers whom he consulted regarding Prince William Henry's introduction to sea life; but if he was, it would seem that Hood regarded himself as an exception to the general rule. But whether he did or not, it seems to have escaped notice of the sea officers of a hundred years later, who still clung tenaciously to the opinion that early entry was essential, that the reason for it advanced by the advisers of King

George III had passed away; and that, moreover, the method of applying the principle had been almost completely changed. It was the hardships of 18th century life at sea that were considered to make it necessary to inure boys to them at an early age; but there were no hardships—the present writer can testify—in the gunrooms of the late 19th century. And whereas the maxim of 150 years earlier had been, "Catch 'em young and send 'em to sea," although the Navy persisted in still catching them young, since the institution of the Britannia in the 1860's they were not sent to sea, but to a harbour hulk or, when she would float no longer, to a college on shore. Their sojourn there varied in length from time to time, but it was devoted almost wholly to nautical subjects such as navigation, seamanship—so far as that art could be imparted anywhere but in a ship at sea—and the technicalities of men-of-war; so that by the time they did go afloat, although they were, at some periods, approaching the age at which their non-naval contemporaries were leaving school for the universities, their own general education had been discontinued for two years or thereabouts, while their technical education had given them no more than a smattering of the special technical subjects then regarded as indispensable to the calling of naval officer.

This procedure had two special results, to one of which reference has already been made at the beginning of this chapter. The first was that, when the naval cadets from the training establishment did go to sea-going ships as midshipmen, it was found necessary to continue their instruction in what were known as "school" subjects in order to convert the smattering into real acquaintance. The second was that, as the facilities for, and the efficiency of, that instruction necessarily varied considerably from ship to ship, in some of which midshipmen learned hardly anything at all—though it may be doubted if they turned out to be any worse officers for that!—and since their further advancement was made to depend very largely on their comparative success in passing examinations, something had to be done to compensate those whose preparation for those examinations had been deficient through no fault of their own, during their years at sea as midshipmen; for if it were not, some of the ablest and most meritorious of the young officers might well find themselves outpaced in the race for promotion by the duds or the mediocre. So it became the rule that "seamanship" was the only subject in which midshipmen were examined for promotion when they had completed their prescribed period of sea time, and that they were examined in other subjects, both theoretical and technical, only after a series of courses of instruction and training in colleges and training establishments on shore. These courses added up in all to about a year.

There were two features of this system of which the disadvantages were patent, and which, in fact, were recognized and pointed out by more than one of the committees which were appointed by the Admiralty from time to time to examine and report on the training of young officers—for example, the Shadwell Committee of 1870, the Rice Committee of 1875, and, most strongly of all, the Luard Committee of 1885. The first was that, as the "school" instruction of midshipmen had to be continued during their service in sea-going ships, the midshipmen themselves were only part-time officers of their ships, since they had regularly to be taken away from the practical performance of their duties as officers, to become once more schoolboys under the officer known as the Naval Instructor. The second was that, just at the stage of their naval career at which they should be emerging from the *status pupillari*, and had acquired sufficient sea experience, and disciplinary experience, to undertake the undivided duties and responsibilities of a sea officer, they were removed for a whole year from the sea, from all contact with ships' companies, and from all opportunity of even witnessing, much less practising, the science and art of leadership of those under their authority. Moreover, this complete break with the real sea service took place at a stage in the career of young officers at which it was most to their disadvantage, deferring for a year their realization of the positions of responsibility to which they had been working up hitherto, and interrupting their graduation into experienced sea officers before that graduation reached a definite stage, and while they were still at what all educational authorities recognize as an impressionable age.

Practically all the responsible witnesses who gave evidence before the committees mentioned were unanimous in condemning the attempt to combine the duties of a subordinate officer in a man-of-war with the continuance of general education under the Naval Instructor. Not only did it prove in practice to be so unsuccessful educationally that it had to be supplemented by the year's educational and technical instruction ashore at a most unsatisfactory age; but it also had a most unfortunate effect on the midshipmen's progress in qualifying as a practical officer during his early years at sea. Either task is a full-time job for a boy in his teens, and to compel him to switch, several times a day, from the position of schoolboy sitting at the feet of a pedagogue to that of an officer in responsible charge of practical work by men under his orders, is to ask too much of any but the very exceptionally gifted. Both committees and serving officers represented this from time to time; but the recommendations of the Committees were consistently ignored by the Admiralties of the day, though some part of the reforms they advocated were occasionally put into force, generally emasculated by omission of the other parts of what were put forward as a logically consistent whole. For instance, at one period Naval Instructors were intended to disappear from seagoing ships altogether; but owing to a series of unforeseen circumstances—which were described in detail in a chapter in "Brassey's Annual" for 1951—that development did not actually come about. At another, it was intended to abolish the shore course for sub-lieutenants that caused so unfortunate a break in the young officers' sea experience at an important stage of his development; but it was found that the intellectual equipment of the young officers was so deficient under the procedure then in force that the abolition could not be brought into force.

There was, of course, one measure which, if adopted, would have avoided all the defeats of the systems which, though constantly changed in detail by what I have described as tinkering, had in essentials prevailed for the best part of a century. That was, to defer entering young officers for the Navy until an age at which their general education was complete, the age at which boys who are to undergo "higher education" leave school for a university. But to do that would be to abandon the sacred principle of "catch 'em young;" and that was just what successive Boards of Admiralty could not bring themselves to accept. It is true that the underlying idea—that they must go to sea at a tender age if they were to have any chance of becoming real seamen—had been thrown overboard, and that from 1902 onwards the plan of sending the youngsters to sea at 13 or so had been replaced by that of continuing their education at a special school, the Naval College at Dartmouth. But since, in order to preserve the appearance of being logical in continuing to advocate an early age of entry, it was necessary to allege some object, other than that of inuring them to the sea while still very young, the argument was adopted that, in order to produce good naval officers, it was necessary that they should grow up in "a naval atmosphere."

That argument might have carried more weight than it did with unprejudiced observers if the principle on which it rested had been universally applied; but in fact it had been, not indeed abandoned, but considerably diluted for many years. Just before the first World War, to meet a shortage of officers foreseen as the result of the substantial expansion of the Navy then in progress, a number of boys were entered direct from public schools at an age several years above that in force for the normal entry, and were sent to sea as midshipmen after a brief course of specialized training. This system—known as the "Special Entry"—proved so successful in producing efficient young officers that it was retained, as an addition to the normal Dartmouth entry, after the emergency which led to its introduction was over. But it was not entirely satisfactory for two reasons. The age of entry was fixed at a figure which, being rather younger than the normal school-leaving age, was disliked by schoolmasters and unattractive to the boys themselves, so that it failed to attract the best of the boys in the schools concerned; and the entrance examination was allowed, somehow or other, to degenerate into a form which was a direct encouragement to the crammer, and precluded any boy who desired to compete from taking the normal course of 6th-form study up to the end of his school career, and thus getting full value from it. For these reasons, the Special Entry failed to produce as many boys, of the standard needed, as its advocates had hoped, and it could thus be regarded only as an auxiliary to the main stream of entries, not as a possible substitute for it. Nevertheless, for many years it produced a substantial minority of naval officers, and none could really maintain that those whom it did produce were in any way inferior to the majority.

There was another source of dilution of the pure stream of boys educated in the "naval atmosphere" of Dartmouth, to which reference is made below. But before dealing with that, it may here be noted that only in very recent years was the age of the Special Entry raised to conform with the normal school-leaving age of those who go on to higher education at an university. That change was without doubt of substantial advantage to the Navy; for it may be taken for granted that of all the boys in a school those who are most likely to make good officers in any of the Armed Forces are those who have displayed the qualities of personality and leadership—combined with intellectual powers that have taken them to the top—that have led to their attaining the positions of heads of their houses, or of their schools. That is the ambition of a schoolboy; and while the age of entry to the Navy was such that it involved leaving a year early and thus abandoning all hope of attaining that ambition, the Navy could not hope to attract those whom it needed most. But this wise and salutary change had not been in operation long enough to produce its full effect when the whole subject of the supply of officers for the Navy was thrown into the melting-pot by the realization that the existing system, cobbled and tinkered from time to time, was not succeeding in producing enough candidates, of the standard the Navy needed, to fill the vacancies the Navy had to offer. Hence the appointment of yet another committee, the Montague Committee of 1952, to discover why that was so, and once again to make recommendations for a system which should fulfil the needs of the day.

Any enquiry of that sort had, of course to take into consideration the early entry which, at the time the committee started work, stood at the age of 16; it had been raised to that figure from 13, at which it had stood for some years, not long before, chiefly for political reasons, into which it is not necessary to go here. And since the case for early entry had for some time rested on the theory that education in "a naval atmosphere" was the only sound method of producing a good naval officer—or at least was the best method of so doing—obviously not only the "Special Entry" dilution of that principle had to be looked into, but also any other instances of dilution of which there had been experience, and their results. Curiously enough, the committee, as far as can be gathered from its report, entirely ignored the most conspicuous example of dilution—that provided by the experience of the late war. There was then an immense expansion of the Naval Service, which had to be effected by taking in volunteers in such numbers that, towards the end of the war, over 90 per cent of the officers serving were temporary officers, some of whom had had some voluntary naval training before the war, but the vast majority of whom had no previous naval experience at all. They filled every sort of position in the Navy, not excepting command of ships in many cases; and the success and rapidity with which they blossomed into efficient naval officers should surely have put an emphatic end to the theory that none could do so unless they entered at the early age. The proceedings and report of the Montague Committee need not, however, take up any more of my readers' attention; for the Admiralty—following the example of its predecessors' action with regard to Committees' recommendations on the entry and training of officers, but with far greater justification—entirely ignored it, and has since announced the details of the reforms now being introduced.

It may be here recalled that, just 21 years ago, the late Admiral Sir Herbert Richmond published a little book on the subject of the training of naval officers in which the whole system then in force, and the developments that had led up to it, were examined with great wisdom and penetration and with the merciless logic of which he was a master. He demonstrated, quoting the dicta of numerous good authorities, that the conditions of this age demand that the officer shall be an educated man. He pointed out the impossibility, noted by nearly all naval officers of authority, and urged by committee after committee of the last century, of combining the duties of an officer with the status and studies of a schoolboy. He condemned, from his own experience and that of many of his own contemporaries and others, the system of interrupting an officer's sea training for a year at its most critical stage. And he deduced the principle that the young naval officer should complete his general education before begininng any sort of specialized naval or nautical training. All these wise and convincing arguments have at last come into their own; for the system now authorized by the Admiralty, to be bought into force as soon as the necessary transitional measures can be taken, adopts them. Sir Herbert Richmond was a man in advance of his time—chiefly because, in the words of one of his admirers and biographers, the naval authorities of the day could not believe that a man of his learning could possibly be the efficient and practical officer that he actually was. It is a tribute to his great qualities that his wisdom should at last prevail in the Service that he loved so well.

Although the recommendations of the Montague Committee were ignored by the Admiralty—with the approval, as far as could be judged from the press comment at the time of its publication, of practically all those, in Parliament and public life generally, who had taken a serious interest in the subject—it is worthy of note that it adopted an important recommendation made in a minority report by one of its members. Entry is in future to be at the age of 18, enabling all boys to take full advantage of the best that their schools have to offer; and care is to be taken that the method of examination and selection does not demand—as it did at one period in the past—any special cramming, or departure from any of the recognized lines of study open to boys in the 6th form at school. On entry, cadets will go to the Royal Naval College at Dartmouth for two years naval and disciplinary training, during which they will undergo the basic professional training that has hitherto been given during their year ashore after their midshipmen's time at sea. Attached to the College is to be a squadron of frigates and minesweepers, in which the cadets will serve for two or more periods, first as part of the ships' complements of ratings, and later being introduced to the duties, navigational and other, of officers—very much as midshipmen are today in sea-going ships, without the interruption of being taken away for "school." They will also be given preliminary experience at a naval air station. At the end of this two years training, the young officers will be appointed to sea-going ships of the fleet as Acting Sub-Lieutenants for a period of about 18 months, during which they will be given opportunities of gaining "watch-keeping certificates"—certificates of competence to take full charge of a ship at sea as Officer of the Watch—and certificates of competence in other branches of the officer's duty, in order to be qualified for promotion to sub-lieutenant. From then onwards, their career will be the traditional progress of the naval officer, promotion to some grades being by seniority, and to the more crucial ones by selection. Whether they are to be rated as Cadets or as Midshipmen during their two years of training at Dartmouth and the squadron of small ships based there has not yet been stated; it may be surmised that they will be Cadets on entry, and rated Midshipmen on passing the preliminary examination that is to be held at the end of their second term presumably to weed out those who seem unlikely to be fully suited for the position of naval officer. But there will be no more midshipmen in ships of the Fleet—a break with tradition, it is true, but one that ought really to have been made about a century ago.

The present writer must not be taken, from that remark, as one who belittles tradition, least of all the traditions of the Royal Navy. None who has served in the Navy for more than a year or two—it might well be put at less—can fail to be conscious of those traditions and to be inspired by them. There were innumerable examples of this not only throughout the last two wars, but on many occasions outside them. But the traditions which inspire devotion are those which are based on high principles of duty and loyalty; and matters of mere convenience of organization must not be glorified into traditions which ought to be unthinkingly preserved. The conditions of life afloat, within the Navy or outside it, have changed beyond the conception of those who were serving in it a century ago. It can hardly be denied that, in some departments of organization, the Navy has been all too slow in keeping pace with that change.

Finally, no commentary on the subject of the entry and training of naval officers would be complete, or could hope to be convincing, without some reference to the sources from which officers for the Navy are drawn. For a comprehensive examination of that very controversial topic, dealing not with the Navy alone but with all three Services, the reader is referred to Chapter I of "Brassey's Annual" for 1952, contributed by the present writer. One brief reference to the subject has been made above, in connection with the recent raising of the age of entry from 13 to 16, alleging that it had been done largely for political reasons. Some amplification of that allegation seems to be desirable; but before reverting to that point it will be convenient to mention the practice, reintroduced by Mr. Churchhill in 1912 after disuse for a century, of granting some commissions to men of the lower deck. They, it will be realized, have had few facilities for reaching the educational standard which, by common consent, is essential to the officer; and it is consequently only the men of exceptional ability from that source who could be even expected to surmount that handicap to qualification. The lower deck, therefore, can supply only a small number of the officers that the Navy needs, and the majority must therefore be obtained from other sources.

It is common ground that up to the beginning of the late war the conditions of entry for naval officers were such as the close their ranks to all except the sons of well-to-do parents. That restriction was in conformity with the practice of the day, though even then its wisdom and desirability were questioned by many far-seeing people. The Navy, they said, should be free to draw its officers from wherever suitable candidates were to be found, and there was no good ground for the theory that the qualities that go to the making of a good officer were a monopoly of the well-to-do. This view was naturally supported strongly by the socialist parties as they grew in political strength; and in conformity with it, some steps were taken to draw a substantial fraction of new entries from other sources, though many still continued to come from those whose parents could afford to give them an expensive education. But socialist theory was disinclined to be satisfied with that concession, and tended to go to the other extreme, and to weight the scales against the well-to-do candidate; and it seemed to many to be more in conformity with that tendency than with the true interest of the Navy that the 16-year-old entry was introduced. That view would seem to have been to some extent borne out by the event; for it was the failure of the 16-year-old entry to produce a sufficiency of officers of the quality needed that led to the appointment of the Montague Committee.

In this matter, it can hardly be contested that the interests of the Navy alone, and not egalitarian or any other political theory, should govern the devising of the system of entry and training. The Navy, like the other Services, needs the best officers that are to be had, and should certainly not limit its selection by any considerations of family or wealth. For the past two centuries, at least, the former have never operated to limit its selection. Family influence, it is true, once gave great advantages to him who possessed it, but they were never exclusive; nor did the lack of it debar from high rank those who shewed themselves fully qualified for it. Up to 1940, however, except for the small number commissioned from the lower deck, the requirement that the officer must be a man of education necessarily limited candidates to the well-to-do; but in that year, that limitation, too, largely went by the board. It would seem that it was the suspicion that it had not been entirely eliminated by the 1940 "scholarship" scheme, and could not be eliminated entirely as long as the 13-year-old entry was maintained, that led to the latter being superseded by entry by open competition at 16 and the cancellation of all financial contribution by parents of cadets after they had passed in. The suspicion may have had some foundation; but the measure founded upon it was clearly not the right one. The financial provisions certainly removed all vestige of "selection by means test"—for which reason they are retained in the new system—but the 16-year-old entry, for the same reasons which, as already pointed out, cramped the "special entry" for so many years, failed to produce an adequate number of candidates of the necessary calibre.

All these considerations have been taken into account in the wise provisions now adopted by the Admiralty. It is the avowed intention of all Governments, whatever their political complexion, that the general educational system of the country shall ensure that the best of educations shall be available to every boy who has the ability to benefit by it, regardless of his parents' means; so that, by making the school-leaving age the age of entry for cadets, and relieving parents of all necessary expenses of cadets under training, every vestige of privilege accruing to wealth should be eliminated. The Navy should now be able to draw its cadets from any source wherein those who have it in them to become good officers are to be found.

But that is not enough. It must also design its system of training so as to foster the qualities that go to the making of a good officer. That it has not always succeeded in doing so in the past can hardly be denied—as many officers well qualified to judge have testified from their own experience; though it is a tribute to the atmosphere and traditions of the Navy that its officers, despite such handicaps, have maintained through two world wars so consistently high a standard. The defects of earlier systems, already demonstrated by recurrent official inquisitions into them, have at last been frankly recognised and are now to be eliminated as soon as the new system can be brought into force.

That new system has the great merit of being designed to fit into the conditions of today, and it abandons any attempt—necessarily vain—nostalgically to preserve conditions that have passed away. It can be logically accepted by all men of well-balanced mind, whatever their political tenets. It is to be hoped that its introduction will mark the end of the process of continual tinkering to which earlier systems have been subject for a century past.

H. G. T.

CHAPTER XXIV

THE POTENTIALITIES OF GUIDED MISSILES

BY REAR-ADMIRAL ANGUS NICHOLL

IN JULY, 1953, the Minister of Supply made a statement about new guided missiles for anti-aircraft defence following firing trials which had taken place at an experimental station. The new missile was described as a rocket which could be guided and controlled from either the ground or from an aircraft. It could also steer itself to chase and hit an enemy aircraft and was stated to have four or five times the manœuvrability of a modern jet fighter. It could fly at over 2,000 miles an hour and to a much greater height than any bomber. Since that date there have been various reports of progress with guided weapons. There has been a great deal of conjecture about their potentiality and there has been a tendency on the part of many people to assume that we are on the threshold of a " press button " warfare era; and that in consequence it will be possible in the very near future for substantial reductions to be made in the size of the land forces required for Western defence. There is in fact nothing to justify such assumptions. Progress is certainly being made with a wide range of new weapons, including guided missiles, but it will be several years—perhaps ten or fifteen years in some cases—before such weapons are in production and have taken their place in our defensive equipment.

The offensive and defensive purposes for which guided missiles are required are these: first, they are necessary for defence against long-range bombers capable of flying at great speeds and heights and capable of carrying atomic and hydrogen bombs. Fighter aircraft manned by pilots, even if capable of supersonic speed, would not provide adequate defence against such aircraft and there is no anti-aircraft gun in existence or likely to be produced which could reach them. Suitable defence against the high flying bomber, therefore, requires a guided missile of the type described by the Minister of Supply.

During the next decade, however, as far as can be foreseen, fighter aircraft will still be required to deal with other types of attacking aircraft. Guided missiles therefore would supplement rather than replace fighters. That being so, there is a requirement for a second type of guided missile to increase the precision and deadliness of fighter attack on other aircraft—an air-to-air weapon to replace the cannon.

Thirdly, there is the requirement for a guided missile for use as long-range artillery from the ground or from ships against targets on the ground or at sea. Finally, there are the long-range rocket missiles of the type used by the Germans in World War II known as V.2s. Attack by V.2s would have particular perils for the United Kingdom. The difficulties of destroying them once they have been fired are immense and if no defensive weapon can be devised to do this, some other means must be found to counter this form of attack.

There have been two distinct types of approach in the development of guided weapons. The method which has presented the fewer difficulties is the guiding of a missile on to a target which the controller of the weapon can see. During World War II the Germans developed a weapon which became known as the guided bomb. This was discharged from an aircraft and directed on to the target by wireless signals sent by an observer in the aircraft. The other method is to locate the control in the weapon itself to enable it to steer itself on to the target—to "home" on its target, in technical language—once it has been placed fairly close to it.

Towards the end of the war in Korea a guided weapon was used by the United States Navy which was something between these two. It consisted of a pilotless dive-bomber carrying a large explosive charge and fitted with a television camera in the nose. The weapon was controlled either from the ship which launched it, or from another aircraft, in both of which there were television screens showing the picture seen by the eye of the camera in the weapon. Controllers could see with great accuracy the direct path of the weapon and could guide it on to the target they wished to hit.

The use of the television camera may prove to be the solution of one of the main problems in ground-to-ground guided missiles. In the case of a guided weapon fired at an aircraft or at a ship at sea, "homing" devices do not present great difficulty. In World War II radar or acoustic means were devised which enabled weapons to steer themselves on to such targets. It is a much more difficult problem, however, to devise instruments which could pick out, say, a certain building in a town or even a particular part of a building which it might be desired to hit. Television apparatus may provide a means of guiding a weapon with pin-point accuracy on to the desired target by a controller who, though many miles away, can see the target on the screen as clearly as if he himself were in the weapon. There is, however, the serious limitation that television apparatus demands daylight and clear skies; it is unable to "see" through clouds or mist. Radar, on the other hand, does not suffer from the same limitations.

BRITISH DEVELOPMENTS

The three Fighting Services and the Ministry of Supply are working closely together on guided-missile research and development. This does not, however, prevent the Services themselves from giving full scope to the inventiveness and initiative of their specialist officers and scientists in tackling the problems peculiar to their own Service. All practical progress is fully shared.

The weapon which has so far made the most rapid progress is the air-to-air missile. Such weapons can be controlled to ride along an electronic beam or alternatively to "home" on to the target. The usefulness of the "beam riding" weapon is limited by the possibility of the beam being distorted by electronic counter-measures of the type so effectively used by Britain in World War II. Homing devices therefore show more promise.

In the development of a guided missile to deal with the high flying bomber, the Royal Navy and the Ministry of Supply have made particularly good progress. The weapon they have produced is capable both of being steered along a radar beam and of homing on to the target. It is in effect a "pilotless fighter aircraft" with a far faster rate of climb and much greater manœuvrability at supersonic speeds than it is possible to achieve with a manned aircraft. Moreover it can reach and destroy bombers flying at heights and at ranges outside the reach of any A.A. guns.

It is a moot point whether shipping in general would be considered worth-while targets for atomic attack, but particularly important convoys or ships such as those carrying large numbers of troops might well be targets for atom bombs. The Navy is taking no chances and is pressing ahead with the development of guided missiles on the assumption that they are the only sure reply to the high flying atom bomber and that therefore, whatever the cost, the Navy must be armed with this type of defence.

The weapon is a large projectile, about 20 feet long and the equipment for firing it is fairly bulky. To mount even one firing equipment and provide the necessary stowage for the projectiles, a ship of the size of a cruiser is required. In March, 1954, the First Lord of the Admiralty gave some information about the ship which had been specially fitted and was about to go into service for carrying out guided-missile trials. When the weapon and equipment have been perfected and are likely to become available for service, the Admiralty will be faced with the alternative of building special ships for the equipment or of modifying existing hulls. This obviously will raise the question of whether existing battleships should be used for the purpose. Britain possesses five battleships and they might meet immediate requirements. The country is unlikely to be able to afford large numbers of guided-missile ships, and it is probable that they would be used sparingly, sailing only with convoys whose safe arrival was of supreme importance to the war effort.

Such guided-weapon ships, however, would not meet all requirements. Their main role would be to deal with air attack, including atom bombers, on the ocean routes. They would be too big for coastal work or in the narrow waters of the English Channel. The Navy, therefore, sees the need for a smaller weapon which could be carried in smaller ships. As far as one can see, however, A.A. guns will be needed as well to deal with close-range targets and to supplement rockets in the case of attack by mass formations of bombers. Only experience will show to what extent guided weapons will replace fighters and A.A. guns.

AMERICAN PROGRESS

Progress in the United States is on similar lines to that in Britain. In addition, however, there has been the development and production of pilotless bombers, some squadrons of which have been incorporated in the air defences of the United States and in the N.A.T.O. defences in Western Europe.

The jet-engined German Flying Bomb, or V.1 of World War II, which had a maximum speed of 400 miles an hour, proved very vulnerable to attack by fighters and anti-aircraft guns. The Americans, however, do not consider the flying bomb an obsolete weapon. They have in production a greatly improved type intended for long-range bombardment from ships. Three cruisers and several submarines of the United States Navy have been converted into guided-missile ships.

In 1951 the United States Air Force formed its first guided-missile squadron equipped with a pilotless bomber called the Matador, or B61.

The Matador is a short-range, tactical weapon—a ground-to-ground bombardment missile with a range of about 300 miles. It can if desired be flown back to base after an attack, but it seems more probable that in wartime it would be expendable, in order to utilise its full range. It can be guided by radar control stations located on the ground or in an aircraft. The Matador can carry the smaller types of atomic bomb which the U.S.A. has perfected and it would probably be crashed on to its targets.

The first squadron of Matadors to join the defences of the North Atlantic Treaty Organisation reached Europe in March, 1954. No details of their speed have been published but they are likely to be slower than the latest Soviet jet fighters and considerably slower than the defensive guided missiles which it must be assumed the Russians either possess now or will have in the near future. It is therefore likely that the Matadors would be used mainly at night, or in bad weather when supersonic fighters would be handicapped. The United States is developing faster types of pilotless bombers and in the meantime these Matadors are providing invaluable training for the N.A.T.O. air forces in the operation of guided missiles.

The United States have also produced a ground-to-air guided missile called the "Nike," a weapon of the type described by the British Minister of Supply. The Nike, about 20 feet long and 1 foot in thickness, has the appearance of a huge pencil with fins fore and aft to steer it in flight. The missile is launched vertically by a booster charge which drops clear after several hundred feet, the missile's liquid-fuel rocket engine taking over. A radar control system on the ground steers the Nike into the general area of the target. Then the radar mechanism in the Nike itself heads it towards the target. Finally, a homing device guides it on to the target.

According to published reports the Americans have a number of other guided missiles under development. There is a ground-to-ground weapon called the "Snark" which is likely to replace the Matador; the "Bowmark," a ground-to-air anti-aircraft missile; the "Falcon," an air-to-air weapon; the "Rascal," designed for launching from bombers flying above and beyond the range of enemy interceptors and capable of homing on to a target city; and the "Regulus," for launching from ships or submarines against enemy ships or targets on shore. In addition the U.S. Navy is developing two anti-aircraft missiles known as the "Terrier" and the "Sparrow."

DEFENCE AGAINST THE V.2

The most difficult problem of all is to find a means of defence against missiles of the V.2 type. When these were used by Germany in World War II it was accepted that the only defence against them was the destruction or capture of the sites from which they were fired. In the case of the V.1 flying bomb attack, the missiles could be shot down by anti-aircraft fire and by fighters, and a certain number were caught in obstructions suspended from barrage balloons. But once the V.2 had been fired, nothing could destroy or deflect it. Fortunately, it could only be directed with an accuracy of about 15 miles round the intended target; but it was only the advance of the allied armies into the Low Countries which saved British towns from an even more severe ordeal than they had experienced already.

The range of the German V.2s was about 200 miles but it is only prudent to assume that weapons of far greater range have now been developed. The Russians captured a number of the German scientists who had been working at the experimental station at Peenemunde and these men have no doubt been kept working busily on their project since that time. The range of such weapons may now be a thousand miles or more, which means that rockets fired from sites in the satellite countries could possibly cover the whole of the United Kingdom. Britain would perhaps be more seriously menaced than any other country by such an attack. Moreover Britain would be at a great disadvantage if it came to a question of reprisals with similar weapons; for while the whole of Britain would be open to attack from sites in the satellite countries, weapons of a similar range in Britain would be unable to reach targets anywhere in Soviet Russia.

This situation raises the possibility of a new development of sea power. No doubt the provision of a suitable platform at sea for the firing of the rockets presents many problems, but command of the sea might enable geographical disabilities to be overcome in a war of long-range rockets. Possibly the problem of defence against long-range rockets is unanswerable but it must always be remembered that Britain does not stand alone. The conditions of 1940 and 1941 would not be repeated in a future war and though the crushing of Britain would be an objective of supreme importance to Soviet Russia, Britain would not be the country from whom Russia would have most to fear. For Soviet Russia, the United States would be the main enemy and like Soviet Russia, and unlike Britain, the United States is a vast territory which would be very difficult to knock out as an opponent, however great the scale of bombing attack. If it came to rocket warfare between Soviet Russia and the free world, Soviet Russia would have as much to fear as the free world as a whole, if not more; for from bases in Western Europe, in the Mediterranean, in polar regions and from islands in the Pacific, Russia could be ringed round with rocket sites. It is possible, therefore, that in this power of retaliation the free world possesses the only answer, but an effective one, to the V.2 threat of the future.

An appalling prospect is conjured up by the thought of the V.2 and hydrogen bomb war and it is very necessary to maintain a sense of proportion. Neither Soviet Russia nor the free world have unlimited resources. Neither side can have all they want of every form of defence and offence. If Soviet Russia were to concentrate on building up a huge armoury of offensive rockets it would have to be at the expense of the means to withstand allied counter-attack. Even if Soviet Russia could knock out one of the allies by a " Pearl Harbour" type of attack it would not save her from retaliation by the other allies and this retaliation does not need to take the same form as the attack. The resources of the free world will certainly not run to a V.2 striking power in addition to the offensive and defensive power they are already building up. This faces the free world with an extremely difficult problem in the right assessment of priorities. V.2 weapons for counter-attack could only be obtained at the cost of something else in our defences—such as defences against air attack or the means of meeting the threats of mines or submarines.

At the same time, the allied capacity for counter-attack with atom and hydrogen bombs compels the Soviet High Command to give high priority to fighters, anti-aircraft guns, A.A. rockets, and defensive measures of all kinds. Indeed the problem of the air defence of their home territory must be a matter of the greatest concern to the Soviet leaders. At the present time the allied vehicle for delivering the weapons of counter-attack is the strategic bomber. This may be supplemented by guided missiles of the V.2 type, or replaced by them if, as is quite possible, A.A. guided missiles make the strategic bomber obsolete.

CONCLUSION

Soviet Russia has much to fear at the present time from a counter-attack by atom and hydrogen bombs. If, therefore, the Soviet leaders decided in the near future to embark on aggression against the West, it seems most probable that they would conduct matters so that the use of atom weapons was withheld altogether or postponed for as long as possible. They would hope to overrun a large part of Western Europe by a sudden attack and so place large forces in territory where it would be virtually impossible for the allies to use atomic weapons. Alternatively, they might as a first step attempt to sever the Atlantic supply routes by an intense submarine and mining campaign. These possibilities lay the greatest emphasis on the importance of the conventional land, air, and sea forces in this atomic age. Provided the allied armed forces are strong enough to hold firm against the first onslaught of a sudden attack against Western Europe or against the Atlantic supply lines, they will form a most important element in the deterrent to war. It is certain, however, that the allied countries cannot afford the strength they would like to have in conventional forces except to the detriment of building up the main element of the deterrent, atom and hydrogen bombs and guided missiles. It is therefore most important that the new weapons should not only be available for strategic counter-attack against targets in the Russian home-land but should also be able to assist the conventional forces to hold up the enemy's land, air, and sea forces by attacking them both in the field and in their bases and airfields.

The greatest problem in defence planning is to decide on the balance to be maintained between the conventional forces and the new weapons, and between one type of new weapon and another. At present strategic bombers are the vehicles for carrying the weapons of counter-attack—the atom and hydrogen bombs which are the main deterrent to Soviet aggression. Three British 4-jet medium bombers, the Vulcan, Victor and Valiant are in "super-priority" for production. The American strategic Air Force, some squadrons of which are based in the United Kingdom and in North Africa, has the B47. All these jet bombers are capable of carrying atom or hydrogen bombs into the heart of Russia at heights and speeds beyond the capabilities of any Russian fighter in existence today. The development of guided missiles capable of countering these bombers, however, may completely alter the situation; and in order to maintain the power of their deterrent, it may prove necessary for the allies to develop pilotless bombers or guided missiles of supersonic speeds to replace their present strategic bombers. These bombers are most expensive to build, they require a large number of highly trained men to man and to maintain them, and they have a comparatively short span of life. They are, therefore, a very substantial item in the defence budget. The question of how much to spend on a type of defence which may become obsolete within the space of a few years is a very difficult one to answer.

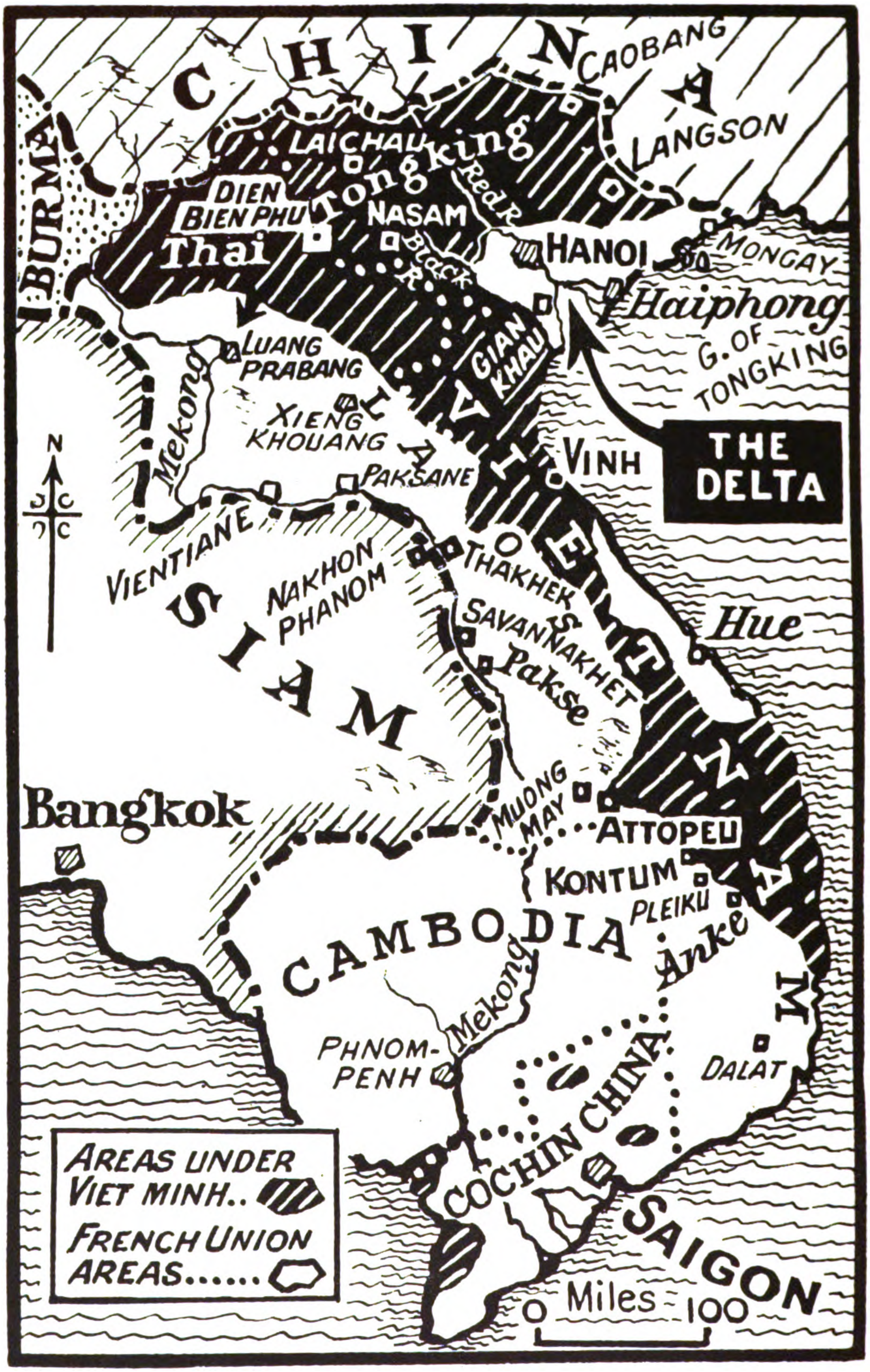
National solvency imposes financial limits on re-armament programmes and the free world will have to make crucial decisions on the structure of defence in the course of the next few years. In the years immediately ahead, which may prove to be a transition period, new weapons will supplement conventional weapons rather than replace them; but because we will never be able to afford all we require to make our defences secure, it will be necessary at some point to make fateful decisions on the balance between manned aircraft and unmanned aircraft and missiles.

ANGUS NICHOLL

(*Picture Post Library*)

KENYA. An officer of the Kenya Police—who co-operate very closely with the Army in anti-terrorist operations—interrogates Mau Mau suspects

16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CHAPTER XXV

THE WAR IN INDO-CHINA

By Lieutenant-General H. G. Martin

(*Military Correspondent of "The Daily Telegraph"*)

Note.—This article was written immediately after the author's return from a visit to Indo-China early in June. It has been revised up to the 14th June and describes the situation as he saw it at that time.—Editor.

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The three Associated States of Viet-nam, Laos, and Cambodia, which together go to make up Indo-China, have very different backgrounds.

The Vietnamese came originally from the Chinese kingdom of Viet which lay to the southward of the mouths of the Yangstse. In the fourth century B.C. they migrated to Tongking and Northern Annam whence they spread into Central and Southern Annam and ultimately Cochin-China. Their new country they called Nam-Viet or "The Land of the South".

Till the tenth century A.D. Nam-Viet was subject to the Emperors of Peking. Subsequently a series of local dynasties reigned in Tongking and Annam, sometimes supported by the Dutch, sometimes by the Portuguese. In due course the disciples of St. Francis Xavier arrived to establish Jesuit Missions. It was a Jesuit Father who invented the phonetic transcription of Chinese ideograms into the Latin alphabet that was to become the Annamite national script.

Towards the end of the eighteenth century Nguyen, Prince of Annam, having lost his throne, appealed for help to Louis XVI. In 1787 a treaty was signed between them, and soon after a French squadron arrived. By 1802 the French had helped Nguyen to recover the whole of his kingdom of Annam from Saigon to Hanoi. The Emperor Bao Dai is his direct descendant.

Nguyen's successors, however, egged on by Chinese intellectuals, began a merciless persecution of their Christian subjects—killing some 40,000 of them. In consequence a Franco-Spanish force occupied Saigon in 1859. Several more French expeditions followed. In 1874 by the Treaty of Hué the Annamite Crown ceded Cochin-China to France and recognised a French protectorate over Annam. China reacted by sending the "Black Banners" to invade Tongking. War did not end till 1885, when by the Treaty of Tien-tsin China recognised France's protectorate over Annam and Tongking. Such in brief is the early history of the Annamites who represent 25m. of the 30m. inhabitants of Indo-China today.

When the French thus intervened militarily in Viet-nam, the Annamite Empire—of Chinese origin as we have seen—had been in the act of expanding westward through the central mountain range to absorb the "Thai" kingdom of Laos (2m. inhabitants) and the "Khmer" kingdom of Cambodia (4m.). Both of these kingdoms appealed to France for protection not only against Annamite encroachment but also against Siamese; by 1884 both had become French protectorates.

Till 1940 the development of Indo-China was continuous. The population increased two-fold. Roads, railways, ports, irrigation, agriculture, rubber planting, mining, medical services—to all of these the French could point as evidence of their efficient stewardship. They made two fundamental mistakes, however, for which they are now paying: they omitted to train either an indigenous civil service or an indigenous army.

After the collapse of Metropolitan France in 1940, however, the Japanese, who were intent on stopping the brisk traffic in arms for Chiang Kai-shek then passing between Tongking and China, demanded the right to occupy Indo-China. The small French forces there had ammunition enough for only four hours' fighting. Having appealed vainly for help both to Washington and to Singapore, General Catroux had to acquiesce. In his own words: "Comme nous n'étions pas les plus forts, il ne nous restait plus qu'a être les plus fins". It is hard to see what else he could have done. The Japanese placed a garrison of 60,000 troops in Indo-China, but the French Army still remained in being and the French administration still functioned. Such was the position till spring 1945.

September 8, 1941, is a notable date in the evolution of Indo-China. On that day Nguyen Ai Quoc—that man of many aliases, now known as Ho Chi-minh—published an appeal to the people of Tongking, announcing the formation of the "Front of Independence" or Viet-minh. The Front's declared purpose was to rid Indo-China of "Fascists", whether French or Japanese. Be it noted, however, that against the Japanese Ho and his Front never fired a shot.

Ho had been born in Northern Annam in 1892, and already had behind him a lifetime of political agitation. This one-time scullery-hand at the Carlton Hotel in Pall Mall had been a Comintern agent in Paris, Berlin, Moscow, and Canton, and had founded the Communist Party of Indo-China. It is often claimed for Ho that he is at heart a Viet-namese Nationalist. That is wholly untrue. From time to time he has maintained a Nationalist façade, but only when he has needed the help of genuine Nationalists to achieve the aim that he pursues with unswerving and ruthless purpose—to make of Indo-China a satellite of Moscow.

By spring 1945 the Fourth Republic was installed in Metropolitan France and General de Gaulle's Government was in office. This Government, lacking the necessary force to send to Indo-China to safeguard French rights and interests, unhappily sent instructions designed to promote a rising against the Japanese. On March 9, 1945, anticipating trouble, the Japanese disarmed and interned all French troops and officials; on March 11 they forced the Emperor Bao Dai to repudiate the Treaty of Hué and the French Protectorate and to proclaim Viet-nam's independence.

These events drew from the de Gaulle Government a "Declaration of Principles": the term "colony" was forbidden; Indo-China was to be a Federation within the French Union. Unfortunately—and this has been true of all the political concessions wrested from successive Governments of the Fourth Republic since the war—these concessions were too little and too late. By this time there were French troops ready to enter Indo-China from the north, but Chiang Kai-shek's Government refused them right of way.

It was in this unpropitious atmosphere that the Potsdam Conference met in July 1945. In President Roosevelt, that great but sometimes misguided man, French "colonialism" had an implacable enemy. Thus, according to Cordell Hull, Roosevelt made no secret of his intention to drive the French out of Indo-China. In consequence of this attitude of mind, the Conference ignored French rights and interests in Indo-China. The Potsdam Agreement provided that, for its liberation from the Japanese, Indo-China should be divided into two zones by the 16th Parallel: the northern half would be occupied by the Nationalist Chinese, the southern half by the British.

A few days later the first atomic bomb dropped on Hiroshima followed by another on Nagasaki; whereupon Japan capitulated. Ho Chi-minh and his guerillas were ready: before the end of August they had occupied Hanoi and forced Bao Dai to abdicate. Ho then proclaimed a Republic and proscribed all intercourse with the French. Murder and pillage were the order of the day.

Soon after, 180,000 Chinese Nationalists entered Tongking, while British forces occupied Cochin-China. Thus it fell to these occupation forces from without, and not to the former French administration and garrison now in durance vile, to take the surrender of the Japanese. Moreover, the newly arrived representatives of General de Gaulle labelled their fellow Frenchmen "maréchalistes" and left them to languish in the custody of the surrendered Japanese. The loss of face thus suffered by all Frenchmen alike throughout Indo-China was catastrophic and permanent. In February, 1946, Admiral d'Argenlieu arrived in Saigon as Commissioner-General, and in March, 1946, the French signed an agreement with Ho Chi-minh that recognised Viet-nam—comprising Tongking and Annam—as an autonomous member of an Indo-Chinese Federation. In return Ho agreed to the re-entry of French troops for five years.

To get rid alike of Nationalist Chinese and surrendered Japanese was now the first task: to reach agreement about the future status and constitution of Viet-nam was the second. Ho was still posing as a Nationalist, prepared for the moment to co-operate with the French at least in cultural and technical fields. After two local conferences had broken down because the French still insisted on maintaining their central authority in the proposed Federation, in May, 1946, Ho headed a delegation to France where he was received with all honours due to him as self-appointed President of the Viet-nam Republic.

In July a conference met at Fontainebleau to draw up a treaty between France and Ho's Viet-nam, but this conference got no farther than its predecessors. In September Ho returned to Indo-China.

On the evening of December 18, 1946, Ho struck. By an act of sabotage he plunged the city of Hanoi into darkness; simultaneously his armed bands attacked the European quarter, killing twenty and abducting 200 hostages. Throughout the Red River delta, along the Annam coast and in Cochin-China, only the vigilance of the French troops prevented widespread massacres. The war in Indo-China had begun.

Ho Chi-minh having thus shown himself in his true colours, the French had to look elsewhere for a figure to whom the Viet-namese would rally and with whom a treaty could be made. Thus they came at last to "la solution Bao Dai". At this time the ex-Emperor Bao Dai was living in

Hongkong, and he was quite astute enough to realise his own value and to demand a proportionate price for his return.

To speed negotiations with Bao Dai the French Command decided that they must clean up the "Redoubt" of Upper Tongking, into which Ho had withdrawn with his Government and troops. The Redoubt is a mountainous quadrilateral whose sides are 50 to 60 miles in length. It is bounded on the east by the Chinese frontier between Langson and Caobang, on the north by the Chinese frontier again between Caobang and the River Claire, and on the west by the River Claire itself. Two main roads from China enter through Langson and Caobang. This knot of green, forest-clad hills with its Chinese hinterland was to play a decisive part in the strategy of the Indo-Chinese war.

There is no doubt that, at this stage, the French expeditionary corps had an excellent chance—it was to be its last—to finish with Ho once and for all. His army was still in the guerilla stage. Unfortunately, however, though the French plan, which had taken six months to prepare, demanded a striking force of 20,000 men, the Government in Paris made no more than 12,000 available. Moreover, on further grounds of economy, it cut down the duration of the campaign to three months.

On October 7, 1947, the campaign began. The French forces overran the Redoubt at very small cost to themselves. In the process Ho's army suffered severely but he and a large part of it slipped out of the inadequate net. Thus when the French forces withdrew on December 22, leaving defended posts along the Chinese frontier from Langson to Caobang, they left also the job unfinished. Strategically they had failed.

1948 was a year of indecision. In the spring the French Government reduced the Expeditionary Corps by 7,000 men. By the autumn, however, it had changed its mind and had promised to send out 12 fresh battalions spread over a period of 8 months. Meanwhile it continued to haggle with Bao Dai over the terms for his return to Indo-China.

The military situation in Tongking remained thoroughly unsatisfactory. Only a narrow corridor connected Hanoi with its port Haiphong; another as narrow connected it with the posts along the North-East Frontier. As for the Thai country and upper Laos: Hanoi was cut off from these altogether by a wide belt of enemy-held mountains.

Time was running out. The Nationalists in China were obviously collapsing; the Communists were nearing the frontier of Tongking. In the Upper Tongking Redoubt the Viet-minh forces—under the impulse of that remarkable man Vo Nguyen Giap, high-school teacher turned, first, Viet-minh Minister of War, and now Commander-in-Chief—were growing in strength and efficiency as though by magic. In the Redoubt in November they took by storm a defended post held by the Foreign Legion.

For his spring campaign of 1949 the French Commander-in-Chief planned a much-needed strengthening of his position in Tongking. In February, however, the Commissioner-General, intent on placating Bao Dai, insisted on the abandonment of this strategical objective in favour of switching the main military effort to Cochin-China. Militarily, this change of plan was disastrous. Politically, however, the pacification of Cochin-China had some success. In Paris on March 8, Bao Dai and the President at last signed a treaty which recognised a united Viet-nam "whose independence shall have no limit other than that entailed by its membership of the French Union."

It is precisely this ambiguous limitation, however, that has bedevilled France's relationship with the Associated States ever since. On the one hand, these States have not been prepared to accept the limitation of sovereignty which Paris has considered to be inherent in membership of the Union. On the other hand, no French Government could hope to persuade the French people to make continued sacrifices on behalf of an Indo-China which had left the Union.

In April, 1949, Bao Dai returned to Viet-nam in triumph. The triumph was short-lived, however. Ho Chi-minh's counter-propaganda called on the people to prepare for a campaign to gain complete independence without limit whatsoever. And psychologically it was Ho who was the winner.

During the summer of 1949 the situation on the North-East Frontier grew so threatening that the French Government was persuaded to send out sizeable reinforcements to Tongking in readiness for an autumn campaign. The intention was to strengthen the delta defences and to destroy all facilities in the Redoubt of which the Chinese Communists might make use if and when they came. At the close of this campaign the garrisons of Caobang and the other frontier posts were to be withdrawn.

In August, however, the Commissioner-General again switched the military effort away from the Redoubt—this time to protect the Catholic communities in South-West Tongking who were threatened with destruction. In consequence the intended withdrawal of the posts on the North-East Frontier had to be postponed—though these posts could now be supplied only by air.

In January, 1950, Peking, Moscow, and the Russian satellites all recognised the Viet-minh Government. Proclaiming 1950 as "the Year of Victory," Ho responded by ordering general mobilisation. By December, 1949, Lin Piao and his Communist armies had reached the North-East Frontier; already by March, 1950, they were providing military aid and training for Viet-minh on a vast scale. In contrast American aid for Indo-China, agreed to in May 1950, had got off to a very slow start, and Paris had chosen this moment to cut replacements for the Expeditionary Corps by 10,000 men. Moreover, the officers and men of the French Expeditionary Corps found themselves without support in France, where the Communist campaign against the "sale guerre" was reaching new heights and the general public remained at best indifferent. Small wonder then that French morale was slumping.

In September, 1950, the French set out—a year too late—to withdraw their garrisons from along the North-East Frontier. It was then that the Viet-minh forces revealed how far, thanks to Chinese aid, they had advanced in less than three years. In a series of disasters along Colonial Route 4 where it hugs the Chinese frontier, the French lost eight battalions or 5,000 men. Finally, in mid-October, they abandoned the all-important road centre of Langson with its depots crammed with stores, thus throwing the whole North-East Frontier open to the Chinese. Such in brief was the worst reverse in the history of overseas France prior to that at Dien Bien Phu. It was in the aftermath of this disaster that General de Lattre de Tassigny arrived to take over the combined offices of Commissioner-General and Commander-in-Chief.

To Giap, flushed with victory, it appeared that Hanoi itself was now his for the taking. And if France had not turned to General de Lattre in her emergency, Giap would have been right. In January, 1951, thirty of his regular battalions, organised in divisions, swept out of the Redoubt to overrun the Red River delta. de Lattre met their headlong rush in the open with the concentrated might of his artillery and air force, and hurled them back with heavy loss.

Giap had to think again. In March he tried a favourite Viet-minh trick—the so-called warfare "de grandes embuscades." First, he attacked a sensitive point to attract de Lattre's mobile reserves. Then he laid an ambush to catch these mobile reserves in motion. But de Lattre refused to be drawn—and gave Giap another bloody nose.

It was at this point—March, 1951—that Ho Chi-minh finally threw off his nationalist guise, converting his Viet-minh or Front of Independence into the Lien-Viet or United National Front, with the Lao Dong or resuscitated Communist Party as its motive force.

That April I visited Hanoi at General de Lattre's invitation. In long talks we had together he stressed repeatedly that it takes locals to beat locals. His primary aim, therefore, was to build up the armies of the Associated States. First, however, he must win a battle in the psychological field—the struggle with Ho Chi-minh for the sympathy and trust not only of the Viet-namese majority but also of the national minorities such as the Thais. This, de Lattre knew, would not be easy. Ho Chi-minh, he said, tolerated no corruption in his Government: insisted on making the people literate; and made no promises which he did not perform. He, de Lattre, must do as well or better. As a first step, he had just sent his only son to serve with a Viet-namese unit—where a week or two later the boy was to be killed.

de Lattre stressed, too, that the defence of the Red River delta—that inexhaustible reservoir of manpower and rice with its 6m. to 7m. inhabitants and its 5,000 villages—was fundamental. Before the Viet-minh could win, they must first possess themselves of the delta. He foresaw with prophetic vision that Ho and Giap, having failed to overrun the delta by direct assault, would now resort to infiltration—to the insidious process of "pourrissement" or corruption from within.

Second only to the delta in importance, de Lattre placed the maintenance of morale. Nothing could be worse for morale, he said, than the loss of a succession of posts. Already the garrisons of the defended posts throughout the delta were living on their nerves, in nightly expectancy of attack. Given reliable intelligence, he could move his reserves in time to meet each threat, but intelligence was so difficult to get—and he dare not move his scanty reserves till he was sure.

I said goodbye to General de Lattre with deep misgivings. Plainly, he was a sick man driving himself unmercifully.

To return to Giap: by May of that fateful year, 1951, his troops were growing hungry, for the Redoubt produces very little food. So Giap next fought the Battle of the Rice in the southern delta on the banks of the River Day. This battle, too, he lost. But not altogether; for it was then that he began the pourrissement of the delta on a grand scale.

In September Giap tried a final throw. He sent nine battalions into the Thai country to attack a small French post. The post held; de Lattre dropped three parachute battalions near it; the besiegers were driven off with loss. Thus Giap lost the fourth round also.

In November, going over to the attack, de Lattre sent his forces to occupy Hoa Binh. The Viet-nimh reacted savagely. To the Viet-nimh Hoa Binh's importance is this: it locks the gorge of the Black River through which runs their all-important supply route linking the North-East Frontier with South Viet-nam, and the delta with the Thai plateau. The plateau's 200,000 hardy mountaineers are, or were, passionately loyal to France. de Lattre, it appears, planned to send a military mission to the Meos and to arm them—but when he went home to France that autumn to die, his plans were still unfinished. In February, 1952, General Salan, his successor, evacuated Hoa Binh. So ended the de Lattre interlude—a year of successful defence that had pointed the way to victory round the corner.

Again in 1952 Ho and Giap made the most of the monsoon season between May and September to build up their regular forces. By October the total of regular Viet-minh divisions ranged around the Red River delta had risen to six. What is more, the French had learnt to regard these Viet-minh regulars as the equals in local conditions of any infantry in the world. By this time, too, the Viet-minh could count on no less than a dozen regional—that is, territorial—battalions and 30,000 guerillas inside the delta defences. By day the French still controlled the roads, railways and modern towns; but the old Tongking—of canals and backwaters, rice-lands and villages deep in the marshes—that now belonged to the Viet-minh, whose shadow government was in every village; which had its committees in every street of Hanoi; which had permeated the Viet-namese army and police.

Such was the situation when in late October, 1952, General Nguyen Son, the Viet-minh Field Commander, staged the first of two remarkable operations. Taking three of his six divisions from round the delta, he set out to overrun the Thai plateau. After trying unsuccessfully to counter this move by a thrust aimed at the Viet-minh supply route from China through Caobang and Upper Tongking, General Salan drew heavily on his delta reserves to fly reinforcements over the mountains and into the Thai "defensive triangle"—Laichau, Dien Bien Phu and Na-sam, each with its air strip. There followed the siege of Na-sam, which took the same course as that taken in its early stages by the siege of Dien Bien Phu fifteen months later. In 1952, however, the Viet-minh forces had not progressed beyond the mortar stage of their evolution: lacking artillery support, Nguyen Son soon found his attempts to storm the fortified camp too costly. Thus by mid-December he had decided to call it a day.

Towards the end of March, 1953, Nguyen Son made his next move. This time northern Laos was his goal, and for the invasion he used four divisions with a fifth on his lines of communication. By early May, and without any fighting to speak of, he had overrun all northern Laos other than the capital Luang Prabang and three other French-held "hedgehogs," for the defence of which General Salan had flown in more of his delta reserves.

At the beginning of the rains in early June, Nguyen Son withdrew his forces back across the Black River to the Viet-minh sanctuary in Upper Tongking. He had good reason to be satisfied with the results of his campaigns of autumn 1952 and spring 1953. He had overrun the whole of the "Black Thai" country, and 20,000 square miles of northern Laos, and had swept away their administration. He had acquired the rice and opium crops, and had scattered the friends of France as hunted refugees. When finally he had withdrawn his invading forces he had left behind the "Free Thai" Government of Prince Souvannah Vong, with its capital established at Sam Neua and its administrative network stretching—albeit somewhat patchily—from Vinh on the coast all the way to the northern frontier with China.

Already on May 18, 1953, General Salan had handed over command in Indo-China to General Navarre. The question arises here: had General Salan been justified in thus dissipating his mobile reserves from the delta to hold a number of isolated posts or towns in the far west country? The garrisons of these hedgehogs could be supplied only by air, and could never hope to be relieved by ground action. Their commitments, therefore, were indefinite and extremely hazardous; and in their absence the all-important delta remained vulnerable. Moreover, as we have seen, these hedgehogs afforded no protection whatever to the country around them. For instance, in his invasion of northern Laos, Nguyen Son showed his disregard for the heavily garrisoned hedgehog of Na-sam by marching two divisions right past it, both going and coming. To give General Salan his due, his strategy had probably been imposed on him by the French Government in Paris.

Within two months of his appointment General Navarre, on a visit to Paris, propounded his celebrated "plan." When the next campaigning season opened in autumn, 1953, Giap's forces—the equivalent of eight regular divisions backed by 150,000 "Regional" (Territorial) troops and perhaps 200,000 guerillas—would be stronger than ever before. None-the-less Navarre proposed two decisive moves, both to be completed by the end of 1955: the mopping up of Viet-nam from south to north, and the smashing of Giap's field army. The job of sweeping up the pieces in 1956—guerilla hunting—he proposed to leave mainly to the armies of the Associated States.

To enable him to achieve his object, Navarre asked for only a small increase in French Union forces but for large increases in the Viet-namese Army and in United States aid in arms and money. His intention was to make increasing use of the Viet-namese Army to relieve French Union forces employed on static duties, and so to free these latter to form a "battle corps"—a mobile reserve—strong enough "to react offensively." This task would demand "a profound transformation of the organisation, habits and morale of the Expeditionary Corps and of the National Armies of the Associated States." To this end the Associated States must be given more and more responsibility—in the spirit of the promise of "total independence" recently made to them: only thus would their forces cease to regard themselves as mercenaries and become truly national.

The Navarre plan meant more money and more men for Indo-China, and the French Government could ill spare either. At home the war was so unpopular that the clamour for a negotiated peace was growing apace.

Before the French Government would commit itself, therefore, it required an assurance from the United States that the necessary military equipment and "direct forces support"—food, that is, and other supplies—would be forthcoming. By September it had agreed to send Navarre nine additional battalions—less than half the number for which he had originally asked—and had approved his plan. The United States is bearing well over 70% of the cost of the war.

The French Government, be it said, was influenced to continue the war less by any expectation that Navarre's plan would win it than by a more modest hope for one or two spectacular successes that would influence waverers and facilitate the subsequent peace negotiations and the disengagement of the French Union forces.

Meanwhile, in pursuance of his plan, Navarre had been carrying out a series of spoiling operations to disrupt the impending Viet-minh winter offensive. Thus in July, 1953, his parachute troops raided Langson successfully and destroyed accumulated stores from China, together with roads and bridges. In the same month, too, his amphibious forces raided the Annam coast, and in October-November he carried out Operation Mouette to disrupt an impending offensive by the 304 and 320 Divisions against the Southern delta.

Thus it was not till late November that the Viet-minh winter offensive began. For the second year in succession Nguyen Son headed for the Thai plateau at the head of three of his best divisions, 308, 312, and 316, supported by elements of his 351 (Heavy Weapons) Division. At the same time the Viet-minh began intensive diversionary activities that have since extended from the Red River delta to central and southern Viet-nam, central and southern Laos and even Cambodia.

To meet the major danger in the Thai country General Navarre dropped parachute troops to seize the cross roads at Dien Bien Phu which he immediately proceeded to turn into a fortress. Leaving two divisions to invest Dien Bien Phu, Nguyen sent his 308 Division to overrun northern Laos for a second time, but once again he found Luang Prabang, the capital, too strong to tackle. So in March, 1954, he ordered 308 Division to counter-march to rejoin the besieging forces outside the French fortified camp of Dien Bien Phu, which by this time had been made exceedingly strong and was garrisoned by 12,000 to 20,000 picked troops, largely consisting of Foreign Legion and North Africans.

The besieging forces comprised 30,000 to 40,000 regular troops, and they too had been digging themselves in during the preceding three months. For the first time they could count on the support of numerous 105mm. field pieces in addition to the usual medium and heavy mortars, recoilless guns and 37mm. light anti-aircraft guns. Moreover, to cut out the long lift from the North-East Frontier and so to ensure adequate ammunition supplies, Nguyen Son had organised a main supply route by Molotova lorry northward through Laichau directly to the northern frontier with China.

On March 15, the assault of Dien Bien Phu began. The "cuvette" or saucer of Dien Bien Phu is about 10 miles long by 5 wide. The defences took the form of a central cluster of strong points around the two airstrips, protected by an outer perimeter around the rim of the saucer. Colonel Christian de Castries, Commander of the fortified camp, held in mobile reserve for counter-attack a large proportion of his force, including some light tanks which had been flown in.

The weight and accuracy of Nguyen Son's artillery fire came as a complete surprise to the defence, and by March 17 his human wave attacks had submerged the two outlying strong points in the north. Of the Foreign Legion battalion holding "Gabrielle" only 40 survived. The besiegers were then able to close on the central keep around the airstrips. The subsequent fighting was savage, following its rhythmic pattern of bombardment, assault, counter-attack, pause to regroup and replenish ammunition, and bombardment once more. At an early stage the besiegers reduced the central keep to a triangle of about two-sides, and put the airstrips out of action. They thus were able to prevent the evacuation of the defenders' wounded, whose condition was unspeakable, and to make even the dropping of supplies and reinforcements a difficult and precarious process. Their 37 mm. anti-aircraft guns appear to be manned by Chinese experts.

Nguyen was completely reckless of losses, which he was able to replace with astonishing rapidity. On May 7th he overran the last remaining resistance.

Saving graces in the battle for the airstrips were the support of the French Air Force, and of French artillery sited in an independent strong point to the southward. Colonel de Castries and his men deserved the admiration and the prayers of the free world; but why, one may ask, were they submitted to such a Calvary? Dien Bien Phu poses the question once more: is a hedgehog or box, supplied by air but completely and permanently cut off from all contact on the ground, a sound military proposition? It does not seem so.

The siege of Dien Bien Phu and all the heroism that it has called forth tend to obscure the fact that it is in the Red River delta that the war will be decided. The defence of the delta ties down the equivalent of seven Franco-Viet-namese divisions; and the defenders have to hold some 1,200 posts to keep open the delta's chequer-board communications for the passage of their reserves. Dien Bien Phu and Luang Prabang have swallowed up all too high a proportion of these reserves, and things have been going badly in the delta in consequence.

Over the past seven years the scales have been weighted in favour of Viet-minh. Ho Chi-minh has numbered in his ranks the élite of Viet-nam, and has waged total war for the liberation of the motherland and the triumph of his ideology. He has promised to purge the motherland of the last Frenchman and to distribute not only all French properties but all so-called "feudal" properties also—and these latter include the royal domains.

The Viet-minh army is mobile, fluid, unpredictable, unidentifiable. "Elle vit dans le peuple comme un poisson dans l'eau." Each soldier carries his bag of rice that lasts him for five or six days; whereafter he usually refills it from a secret dump that has been laid down for the purpose by sympathisers who have gone before. In his wake swarms of porters move like ants, bringing up munitions of war by toil as laborious as that which went to build the pyramids. His leaders never change and are completely ruthless, caring nothing for losses so long as these achieve their object. He "knows what he fights for, and loves what he knows."

At the blood donors' centre in Saigon it is the Viet-minh prisoners who come regularly to give their blood, and who think it necessary to explain if they miss their turn. Next in the scale come the Vietnamese in the Expeditionary Corps. A bad last are the men of the National Army.

To all this, France and Viet-nam have had little to oppose. Every two years or so new French Commanders have come, to learn their jobs afresh. Their troops have been fortress-bound or tied to the roads. At home in France very many are against the war, and nearly all would make peace at almost any price. It is an incredibly hard war: yet till the epic of Dien Bien Phu fired the imagination of the world all the bitter sacrifices that the French soldier has made—all his devotion—too often have gone unnoticed in the Paris press. In such circumstances, "It takes character to ignore the West," as General Cogny, Commander in Tongking, wryly pointed out not long ago.

On May 15, immediately after the fall of Dien Bien Phu, the Viet-minh began to move their divisions back to the delta once more. As I write on my return from Hanoi early in June, the situation is this: 308 Division is regaining its old station beside 312 Division on the northern face of the delta; 351 (Heavy Weapons) Division has already regrouped in its old quarters opposite the north-western apex of the perimeter; 304 Division is back round Thanh Hoa, and 316 Division in the area to the northward of it—both opposite the south-western face of the delta; 320 Division has infiltrated into the southern delta and is doing its best to blockade the principal towns such as Nam Dinh, Thai Binh and Phuly; and at least six independent regiments—also inside the delta—are trying to cut Route Colonale No. 5 and the railway that link Hanoi with its port of Haiphong. The object of the Viet-minh is plain: it is to create half-a-dozen Dien Bien Phus varying in size from Hanoi itself with its 350,000 inhabitants downwards.

General Cogny told me that he is by no means certain that these four divisions returned from Dien Bien Phu will attack before or during the heavy rains. The Viet-minh are naturally methodical and would prefer an interlude during the monsoon in which to absorb replacements and reorganise generally. This year, however, the wish to prevent Geneva with a fait accompli may be paramount: thus by mid-June a large-scale attack on the delta may well have begun. If it should come, General Cogny believes that he can hold it—till the end of the rains. To this end he is concentrating his forces for the defence of the vital areas of the delta. What he would find most difficult to counter would be infiltration by the two divisions in the north, 308 and 312, directed against R.C.5.

The longer term picture is less favourable, however. If the Viet-minh should prepare methodically for an autumn campaign in Tongking, General Cogny could not hope to hold on without very large reinforcements.

M. Dejean, whose task it had been to shed the powers of a viceroy and to assume the status of an ambassador, is now gone. So too is General Navarre, the Commander-in-Chief. General Ely replaces them both, with both civil and military powers.

As for the Navarre Plan, it is no longer viable because the Viet-namese National Army—upon which the plan ultimately depended—is a broken reed. The National Army has a paper strength of some 300,000 men. And there are enthusiasts about—such as Nguyen Van Hinh, the young Viet-namese Chief of Staff, who is a former squadron leader in the French Air Force—who clings to the belief that a National Army can be formed equal to that of the Viet-minh. But how, these enthusiasts will ask you, can they raise such a National Army when there is no national leadership—when the Emperor and so many of his Ministers spend their time in France at this crisis of their country's history? On every hand one hears the same comment: "What this country needs to save it is a Syngman Rhee." Instead it has a regime of unparalled corruption and luxury. The "Solution Bao Dai" has been a sorry failure.

The men in the National Army are the same men who form the armies of the Viet-minh. Why then do they not fight as well? The answer is that potential recruits for the National Army respond to no national spirit—no patriotic urge. Those who can afford to do so go to France and stay there. The Nationalists who shout loudest against the French are the very men who have comfortable sums salted away in France. Of the poorer classes all are gamblers and almost all are in debt: they cannot make ends meet on army pay. The fanatics all joined the Viet-minh long ago. The Viet-namese Army has to be satisfied with the ordinary villager who does not relish his prospect of foot-slogging through the water-logged "rizières", only to get killed in a cause that leaves him cold.

In consequence the 1929–33 classes, recently mobilised by Decree, have evaded conscription in a big way. Of 80,000 called up, I learnt on good authority, only 8,000 appeared; the rest had either bribed the police or just vanished away. The Commandant of a large French Training Establishment told me that to get 3,000 recruits for his school, 10,000 have to be summoned. Moreover, though the Viet-minh forces will go wherever they are sent, the men of the National Army will serve only near their homes—Northerners in Tongking, Southerners in Cochin China, those from the centre in Annam—and it is their common practice to take their families with them into the field.

The system of officer selection is equally unsatisfactory. While the Viet-minh pick their officers from among N.C.O.s from the villages who have proved themselves in the field, the Viet-namese Government chooses the great majority of its officers on social or family grounds. Few are interested either in their profession or in their men.

In Tongking one or two mobile groups of the National Army are fighting well. There the magnificent corps of French officers still provides the framework of steel that holds all together. Elsewhere, however —wherever the National Army has relieved the French Corps Expeditionaire—it is a different story. In central and southern Annam, in the Old Province of Cochin China and in Trans-Bassac in the extreme south, the National Army has lost all the gains so painfully achieved by General Chanson and others in the past. Desertions from the National Army to the Viet-minh are common. Posts are handed over without a fight.

Roads that used to be safe are safe no longer. The famous "rafale" or procession of half-a-dozen trains in tandem that use to run periodically between Saigon and Natrang does so no more: the Director of Railways told me sadly that many kilometres of the rails have been torn up and twisted. All this has happened in areas for which the National Army is responsible.

The Communists are of course perfectly well aware that the Viet-minh have the ball at their feet; so it is futile to imagine that they will give away at Geneva what they can win in Indo-China. They will play for time, if necessary accepting a breakdown of the conference. "Re-grouping" and "partition" mean to them one and the same process, which they will carry through by force majeure.

When the process is complete, the Viet-minh will point to the map and will say: "Here is your partition". The map may show the Franco-Viet-namese still in possession of bridgeheads in the Red River delta, in the Tourane enclave and round Saigon; and the Laotians and Cambodians still in possession of considerable portions of their own territories. The Viet-minh will be in occupation of the rest.

The parallel between the course of events in North Korea, Indo-China, and Malaya has been disturbingly exact. In each the development of Communist strength follows, or may yet follow, the same pattern. Broadly this development takes place by four stages. At first the indigenous Communist forces are in the guerilla stage; a stage that lasts as long as their homeland or base remains out of physical contact with the main Russo-Chinese bloc. For the Viet-minh this first stage ended with Lin Piao's arrival at the North-East Frontier in December, 1949. For the Malayan People's Liberation Army, on the other hand, it still persists.

The second stage we may call the "mortar stage", for the mortar is the poor man's artillery. In Korea this stage lasted till autumn 1951, when the Sino-North Korean forces, with Russian help, were able to advance to the third or artillery stage. Their subsequent progress was remarkable. Within a year or so they were putting down artillery concentrations that rivalled in intensity any known in World War I.

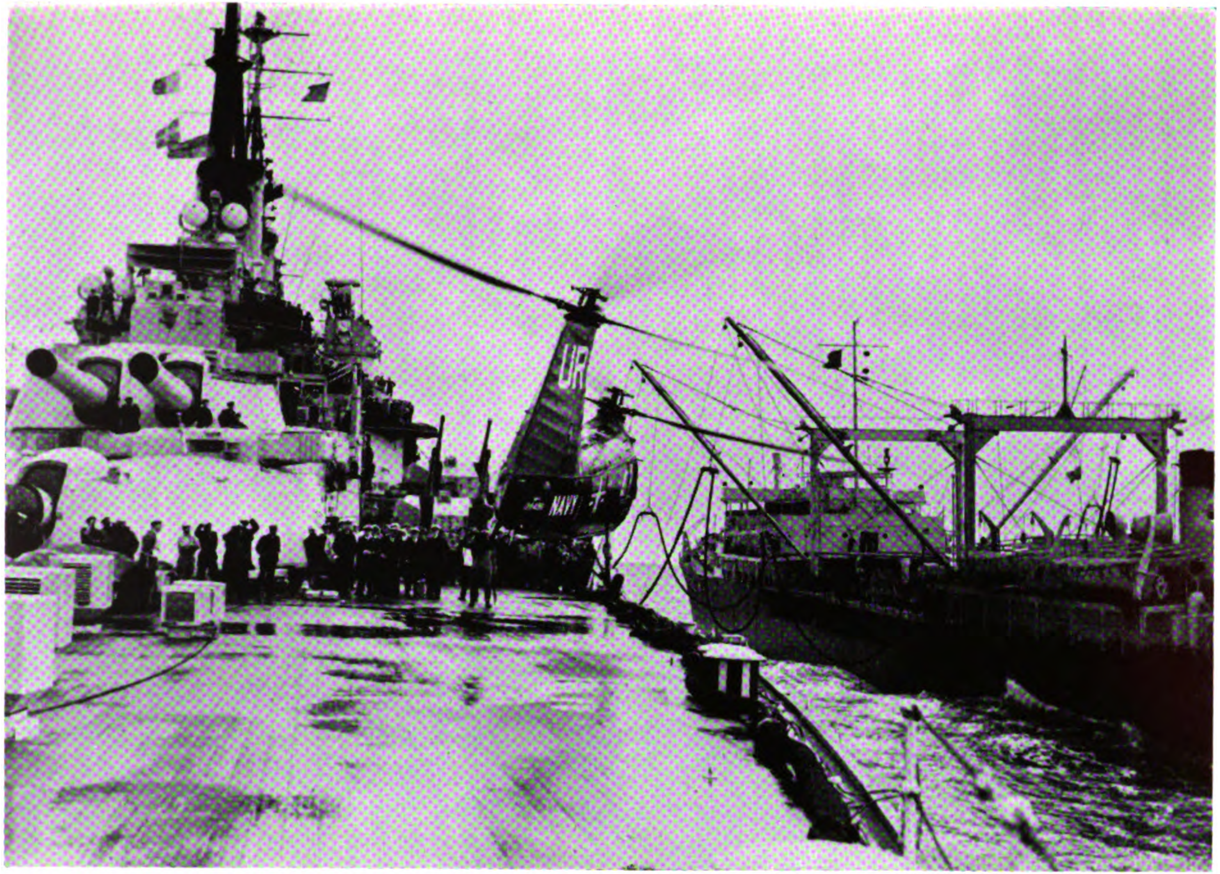
In Indo-China the second or mortar stage lasted till the beginning of this year, by which time the Korean Armistice of July 27, 1953, had released supplies of more expensive ordnance for Viet-minh. Thus the Viet-minh, too, are now well into the third, or artillery, stage.

In the fourth and final stage the indigenous Communists are equipped with air forces, and so can "shoot the whole works". This is the stage that the Sino-North Koreans have now reached in Korea. If fighting should break out there again, these Sino-North Koreans—who, in contravention of the Armistice, have improved the shining hour by repairing their forward airstrips—would find themselves already in this happy position. And it will not be long before the Viet-minh follow after them. It is at this point in the history of conventional warfare that high-grade Western man, faced by the hordes of Asia, wakes up to the unpleasant fact that "the odds are on the cheaper man."

And what of the Malayan people's Liberation Army?—From the Communist viewpoint, a retarded growth. If Indo-China should fall, Siam would fall likewise—and the Communist bloc would be in physical contact with Malaya. At once the Malayan People's Liberation Army would advance at least to the mortar stage. Moreover, that contact would undoubtedly touch off a chain reaction which would be very rapid indeed. North-westward it would run through Burma to India. Southward, the Malacca Strait would not stop it; Indonesia would be powerless to resist it; it would run like wild-fire to the threshold of Australia.

Those then are the prospects that face the United States and the British Commonwealth unless Indo-China can be saved. To send troops to Indo-China is not an inviting prospect: the more so since it is not a theatre in which air power, whether tactical or strategical, can be decisive. Land forces would have to intervene in large numbers, and an advanced base would have to be created in Indo-China for their use. Better to fight now, however, when the magnificent French Expeditionary Corps is still in being than to fight later and in much worse circumstances. The fate of the last great reservoir of manpower in the world—and with it the fate of the world itself—is at stake.

H. G. Martin



(*Official Admiralty Photograph*)

Helicopter from U.S.S. Bennington landing on the quarterdeck of H.M.S. Vanguard while oiling at sea

CHAPTER XXVI

FOREIGN NAVIES

PERHAPS THE most salient aspect of 1953 in the general shape of most of the navies of the principal foreign powers has been a tendency to restrict new construction to very modest proportions. It is no more than a tendency, reflected chiefly in the reluctance to place new orders rather than to slow down on building now in hand, and a worsening political situation could lead to a reversal of that tendency without much harm having been done. On the other hand, a great many naval ships now in commission are approaching obsolescence and the problem of replacement looms larger with each year that passes.

The two main causes of this tendency of restriction are the ever growing costs of new building and a small reduction, perhaps symptomatic of further stringency in store, of American defence aid. A modern destroyer today costs as much as did a battleship in 1914, and a single large fleet carrier in 1954 runs into something over £20,000,000, an almost intolerable burden in the present economic state of most democratic countries. American aid, until recently handed out with something approaching prodigality, is now being more closely scrutinised by the new Republican administration in the United States, and the principal beneficiaries are tending to draw in their horns before becoming too deeply committed to new construction.

Across the Atlantic, the reason for a slight falling-off in the rate of naval expansion is somewhat different. In spite of calls for reduced taxation, the general expanding economy of the United States can comfortably absorb any financial demands made by the Navy Department, and it is not lack of dollars that has slowed down the placing of new orders. Rather is it the formulation by the State Department of a new concept of American strategy, typically named, with true American felicity in the choice of words, the "new look". Under this doctrine, aggression is not necessarily met by an immediate defence, but by counter-action "where it is likely to hurt most". This has been universally held to mean that the United States will meet new aggression by atomic attack in a region of her own choosing, and the immediate naval effect has been the cancellation of orders for five new ships, the decision to reduce to reserve another 50, and a corresponding reduction in immediate manpower. Many observers were slightly discouraged at the first strategic decision made after the announcement of the "new look", when an added aggression in Indo-China was met by the allocation of a few obsolescent bombers to the French Union forces. This was so similar to the "old look" practice, that naval circles in the United States at once expressed doubts as to the wisdom of the proposed cuts in immediate building.

Russia, as has been the case every year since the war, has continued on her course of naval expansion, and of an overall growth of some 150,000 in the strength of her armed forces, almost the whole of this number is accounted for by the Navy. Building has continued at full pressure in all the naval shipyards, and although details of new construction are invariably kept secret, it is known that the maximum concentration is still upon cruisers, destroyers, and submarines. It remains a matter of some surprise that, in view of Russia's growth as a maritime power, the whole of her naval aviation remains shore-based.

The technical background of the naval year has been dominated by the continued research into atomic power and its development into new methods of use. The first atomic submarine was launched in the United States in January, 1954, and reports from that country indicate that atomic propulsion may next make its appearance as the motive power for aircraft carriers. The guided missile, with and without an atomic warhead, is also having a profound influence on naval building, and indications are that the despised battleship may well resume her classical role as the prime naval ship in the form of a highly protected launching platform for long-range guided missiles.

Generally speaking, technical development among the more important of the world's navies is leading to a state of affairs where two ships are now required to do the work that one ship used to do less than ten years ago. This is especially the case in the anti-submarine role, where the development of electronics and supersonic devices has led to such intricate installations; and simultaneously to so great an increase in complement to operate and service them; that no one ship of economic size can house them all. This tendency is spreading also to naval aircraft, making ever more burdensome the task of efficient carrier operation, especially in an anti-submarine rôle.

Many of the smaller navies in the N.A.T.O. confederation have benefited considerably under the American "off-shore" purchase arrangements and many new ships, of frigate size or smaller, have been added to existing fleets under this stimulus to naval building. Speaking generally, most countries have taken advantage of an apparent clearing of the political atmosphere to slow down the ordering of new ships on their own account, possibly in an effort to relate defence expenditure more closely to the straitened economies of today.

UNITED STATES

For the second year in succession the Navy appropriations show a reduction from the immense sums voted during the period of most active rearmament during the Korean operations. In comparison with the peak figure of $15,580,511,392 in 1951–52, the budget proposals for 1954–55 ask for a sum of $10,500,000,000, which is a reduction of $800,000,000 on last year's appropriation. This new figure, at the time of writing, has still to be approved by Congress, which may well decide to reduce it still further.

The Navy is budgeting for a gradually decreasing manpower total over the next three years. With a present total strength, including the Marine Corps, of just over a million men, the figure by June, 1955, is expected to be down to slightly over 900,000, with a further estimated drop to 850,000 by June, 1957. This reduction, it has been reported, is to be made good by denying re-enlistment to those who are not likely to reach the rank of petty officer, and although that policy will probably reduce overall strength by more than the desired number, the deficiency will be made good by additional encouragement to suitable men to make the Navy their permanent career.

The "new look" policy of defence, combined with the current reductions in appropriations, is expected to send 50 ships of the present commissioned fleet back into reserve over the next 18 months, including probably two, and possibly three, battleships. The one type of ship not affected by this decision is the carrier, indeed one or two now in reserve may be brought forward into operational service in order to strengthen the air arm. Even with these withdrawals to reserve, the strength of the U.S. active fleet is still immense, some 1,200 ships being in full commission.

Admiral Robert B. Carney succeeded Admiral William Fechteler as Chief of Naval Operations during 1953, the latter taking over Admiral Carney's former appointment as Commander-in-Chief, Allied Forces, Southern Europe. Admiral Lynde D. McCormick, at the moment of writing still Commander-in-Chief, U.S. Atlantic Fleet and also Allied Supreme Commander Atlantic, is to be succeeded by Admiral Jerauld Wright, formerly commanding the U.S. naval forces in the Mediterranean and Eastern Atlantic. Admiral Wright's successor in the eastern Atlantic and Mediterranean is Vice-Admiral John Cassady. Vice-Chief of Naval Operations is Admiral Donald Duncan, and the important Pacific command is now held by Admiral Felix B. Stump, who relieved Admiral Arthur Radford on the latter's appointment last year as chairman of the Joint Chiefs of Staff Committee. Last March President Eisenhower nominated Mr. Robert B. Anderson, Secretary of the Navy, to be Deputy Secretary of Defence, in the place of Mr. R. Kyes, who resigned. The new Secretary of the Navy has not, at the time of writing, been announced.

In the article on foreign Navies last year some of the difficulties facing the United States Navy in relation to the lack of oversea bases were mentioned, difficulties which were only partially solved by the maintenance of extensive fleet trains. During the year under review a considerable change has taken place through various agreements negotiated with foreign countries by which oversea bases are being acquired for various terms of years under direct lease. In most cases the acquisition of these bases involves a considerable expenditure to fit them to a standard where they can handle major American ships.

The most important of these agreements is that negotiated with Spain, under which the United States obtains the use of naval and air bases. Although so far mention has only been made officially of Cadiz as a main naval base, it is considered certain that Cartagena is also to be converted to American naval use as a fully equipped main base, and that Corunna is likely to be developed as a subsidiary base. Other places mentioned as likely to be available to the American Navy for certain facilities are Ferrol, Valencia, Alicante and Malaga on the mainland, and Port Mahon in the island of Minorca.

The importance of this agreement cannot be overestimated, for it now establishes the United States as a Mediterranean naval power. The Sixth Fleet, which until now has operated in those waters, depended mainly for its supplies and maintenance on an extensive fleet train, known in the United States as "mobile logistic support groups", working from America, together with certain docking facilities at Gibraltar and Malta. All major repair work involved the return of the ships concerned to the United States. Now this can be altered by the long-term acquisition of Spanish bases which will enable the Sixth Fleet to be permanently and efficiently based in the area in which it operates. Cadiz and Corunna, in addition, have considerable strategic value as terminal bases for the Atlantic convoy routes and for dominating the approaches to the western Mediterranean.

A pact signed in October, 1953, with Greece provides for the construction of modern air and naval bases in that country for joint use by the forces of each nation. No details have yet been announced of where these bases are to be built. A similar arrangement with Turkey has been announced, although in this case the bases are designed to serve the N.A.T.O. forces in the area, which include, of course, ships of many other countries. It has also been reported that considerable work has been done at Manus Island in order to rehabilitate it as a major naval base in the south-west Pacific area.

The main research project in the United States Navy continues to be the application of nuclear fission to naval uses. The world's first submarine to be propelled by nuclear fission power, though without its reactor fitted, was launched in January, 1954, and construction of a second is well under way. The 280-mm gun, of which a naval version has been constructed, successfully fired an atomic shell in the presence of a distinguished gathering of senators and congressmen. Further atomic tests, in which the U.S. Navy had a share, have been carried out, and an appraisal of the devastation caused by the explosion of a thermo-nuclear bomb in 1952 has been made public. In this test the hydrogen bomb was placed on a small coral island and in its place left a crater 175 feet deep. It was calculated that the area of devastation covered some 300 square miles. Atomic tests reported so far this year included the explosion of two more thermo-nuclear bombs of at least twice the destructive power of that quoted above.

In all of these tests, of course, the Navy is vitally interested and it is possible, by following the broad outline of current experiments, to make some sort of estimate of the shape and influence of the American Navy of the future. While the cost of turning over completely to atomic power is still fantastically prohibitive, there is no doubt that, with each successful experiment, the cost is falling and may yet be reduced to a figure that will make it a practical proposition.

In addition to atomic power as the prime mover of ships, the day of the atomic gun has also arrived, making nuclear fission a tactical weapon as well as a strategic one. Whereas the gun, as developed so far, is in its naval version designed only to support amphibious operations, there is no reason to suppose that it will not eventually make its appearance as the primary, or even secondary, armament of capital ships. It is probable, in the light of many pronouncements by responsible persons, that the American capital ship of the future will carry guided missiles with atomic warheads as the main long range attack weapon, perhaps allied to the atomic gun as the closer-range weapon. This, of course, is looking fairly far into the future, but there can be little doubt that a considerable body of naval thought is planning such a development as a long-term project.

There has been no further report of the project, announced last year by the Atomic Energy Commission, of building an atomic power plant for a "large naval vessel, such as an aircraft carrier", although several American sources mention some of the new 60,000-ton carriers as likely to be fitted with atomic propulsion. It was reported at the time that a contract for such an installation had been given to the Westinghouse Electric Corporation, and this would seem to be a logical development of the smaller installations to be fitted in the submarines Nautilus and Sea Wolf.

In the sphere of guided missiles, a series of photographs was published during 1954 showing the operation of the "Nike" supersonic guided missile in an anti-aircraft role. It is understood that these missiles are to be adapted for ship operation in addition to their normal land role. Live tests against pilotless bombers were reported to be completely successful.

There have been no reports of further developments in connection with the submarine which was to have been fitted with a closed cycle propulsion unit and it seems possible that completion of the design has either run into difficulties, or is in abeyance pending evaluation tests of the nuclear-propelled boats. The closed cycle method of propulsion would probably be considered only a second best to atomic power, since radius of action submerged must obviously be limited to some extent by the volume of the catalyst to be carried. As a problem in economics, of course, the high test hydrogen-peroxide closed cycle method of underwater propulsion wins the battle with a very large margin to spare.

Until the evaluation tests of the Nautilus are carried out, the main development in the active submarine fleet of the U.S. Navy is the continuation of the Guppy programme. Conversions to Guppy are limited to submarine of the two main classes, Tench and Balao, the new boats of the improved Tang class being already built to Guppy design. Several more conversions to radar picket boats have been made during the year.

The main lines of naval research in spheres other than that of nuclear explosion and propulsion have again been in electronics and anti-submarine equipment, and in the further development of ground-to-air and air-to-air guided missiles. Although no startling new techniques have been reported, many speeches by public men throughout the year have dwelt on the progress made, most of which is designed either to give increased warning of possible attack by increasing the effective range of radar, or of automatic destruction well outside the national boundaries of the country. It is for the purpose of increased warning that so much attention has, in the last two years, been paid to the provision of radar picket submarines,whose task is to give the first intimation of approaching danger far beyond the range of shore-based installations.

It has been reported that considerable progress has been made in three directions in the search towards more efficient anti-submarine methods. On the detection side are a new airborne radar, which is stated to be more selective and with greater range than sets previously fitted in aircraft, and adaptation for use by naval helicopters of asdic and sonobuoy procedure, in which these instruments can be lowered into the sea from a hovering machine and operated from inside the helicopter's cabin. On the attack side, the main body of research has been directed towards the underwater hunting of enemy submarines, using specially fitted submarines purely in an anti-submarine rôle.

Considerable disquiet was expressed during 1953 at the behaviour of many United States ships while at sea in rough weather during the large scale exercises carried out in the Atlantic under the code-name Mariner. There had been some similar criticism in the corresponding exercise of 1952, known as Mainbrace, during which equally severe weather had been experienced. In both these exercises excessive rolling and pitching had made some American ships unmanageable, and caused others to retire from the exercise for repairs. The battleship Iowa was rolling up to 26 degrees on either side, and the carrier Bennington up to 34 degrees. The heavy cruiser Worcester was damaged by the heavy seas and was forced to retire.

The main cause of this apparent unseaworthiness is that most American warships are built with as much of an eye to operations in the Pacific as in the Atlantic, and consequently may lack some of the robustness which characterises the ships built by the mainly Atlantic powers. Low freeboard and heavy installations above the upper deck accentuate any tendency to roll in heavy weather and also make for "wet" ships.

In a statement issued after Exercise Mariner, Vice-Admiral Thomas Combs, who was in command of the allied striking force, said that "it was reasonable to expect that even some minor change in design will come in the future as the result of experience in the exercises, particularly as concerns United States vessels." This must obviously take the shape of higher freeboard hulls, possibly with a reduction in the considerable flare which is so much a feature of most United States warships. A pronounced flare, especially in the case of aircraft carriers, is always apt to produce excessive pitching in a heavy sea.

The long negotiations with Russia for the return of 670 lend-lease ships, which include 186 small naval craft, and the settlement of outstanding lend-lease accounts, have dragged on throughout the year under review. This matter has now been a bone of contention between the two countries for some seven years and, although reported continuously as on the point of settlement, appears to be only partially nearer a solution. Of the 186 small warships concerned, mainly motor torpedo boats and submarine chasers, Russia has at last agreed to return 26, which were due to be handed over in Turkey during the current year.

Throughout the year the active Navy has been occupied largely with large and small scale exercises mainly designed to promote co-operation with other navies in international operations at sea. Frequent minesweeping exercises have also been held to test modern methods of sweeping against the various new types of mines which have made their appearance in recent years. Convoy exercises carried out during the year are reported to have produced many valuable lessons.

The U.S. Navy is still interested in the study of cosmic rays and during the year under review "captured" particles at a height of over 60 miles above the earth's surface. The experimental guided-missile ship Norton Sound, together with the naval icebreaker Staten Island, is engaged in this work and they have both been operating off Resolution Island, south-east of Frobisher Bay. The particles were obtained by means of a rocket fired from a balloon at a height of 50,000 feet. In a note issued to the press by Dr. F. F. Singer, of the naval research office, it was stated that the icebreaker would move northwards towards the geo-magnetic pole (not to be confused with the magnetic north pole) in order to carry out further research of this nature. It was stated that at the geo-magnetic pole the earth's magnetic field caused the minimum deviation in the path of cosmic ray particles. It has been reported that these researches are likely to have considerable military, as well as scientific, significance.

BATTLESHIPS

The four Iowa-class battleships have remained in active commission during the past year, but it has been reported that in all probability two will reduce to reserve. The Wisconsin is mainly used as a training ship for midshipmen.

The battle-cruiser Hawaii, of the Alaska class, has been redesignated as a large "tactical command" ship, her two sisters, Alaska and Guam, now being rated as large cruisers. With a displacement of 27,500 tons, they would seem to be a little over large for consideration as cruisers. The Hawaii, on which building was stopped during the war, is expected to be completed this year and may well be in commission by the time these notes are printed. As a command ship she will carry little more than token armament, but is being fitted with a great deal of radar, wireless and radio-telephone communication installations, and headquarters equipment. It is assumed that she will carry the flag in fleets or large carrier task forces.

Another battleship, albeit a very old one, has been redesignated. She is the Mississippi, a veteran of 1917 with a displacement of 29,700 tons, now converted into an experimental gunnery and guided missile ship. Her 14-inch turret aft has been hoisted out and in its place she now operates "Terrier" missiles from quarter-deck launchers. She is also fitted with rocket launchers. It has been reported that she is evaluating new twin mountings for 5-inch 54 calibre guns and for 3-inch 50 calibre guns.

There has been no further work carried out during the year on the Kentucky, the fifth battleship of the Iowa class. She is still laid up in the Navy Yard at Norfolk, Virginia. Work was originally suspended on her pending consideration whether to complete her with rockets as her main armament. She will only be completed in the event of a future emergency, but it is understood that plans are in hand to fit her with guided missiles should it ever be decided to resume construction. She has her machinery installed and is some 70 per cent completed.

AIRCRAFT CARRIERS

The giant carrier Forrestal, due to be launched last spring, is expected to complete at the end of this year. She is, by a very handsome margin, the largest aircraft carrier ever built and, with a flight deck some 1,000 feet long by 220 feet wide, can operate larger and heavier aircraft than are normally based in a carrier. She will be completed with the new angled deck and steam catapults, both of British design. Her designed speed is 33 knots and it has been stated that she is more heavily armoured than is normal in carrier construction. Details of her A/A armament have not yet been announced. Her peace-time complement is stated to be 3,500, with a further 900 or thereabouts in war. It is understood that the original plan to give her a completely flush flying deck has been modified and that, when she reaches completion, she will have a more or less conventional island.

The second 60,000-ton carrier of this class, the Saratoga, is expected to be completed in 1956. She will differ from the Forrestal in several respects, and her machinery is expected to give her an added two knots in speed. Her outer hull is reported to be carried right up to the flight deck in the bows to give her greater seaworthiness in rough weather. She, too, is to be completed with an angled deck and, like the Forrestal, will be fitted with a television system to give assistance to aircraft landing on. If the original plans are to be carried out, a third 60,000-ton carrier should be laid down this year.

It has been reported that the three Midway-class carriers are to be taken in hand in the near future to fit the angled deck. Of the Oriskany class, the Bon Homme Richard and Shangri-La are to be fitted with it, while of the original Essex class the Antietam has already been so fitted and the Lexington will be taken in hand for fitting.

There has been some confusion in recent years between the Oriskany, or improved Essex, class and the original Essex class, and the two types have frequently been considered as a single class. It has now been decided to make a complete separation, and the 13 ships of the Essex class which have been reconstructed are now known as the Oriskany class, leaving ten of the original carriers to be known as the Essex class. Even this re-classification may still lead to some confusion as the Essex herself is now in the Oriskany class. The reconstructed ships, in addition to the Essex, are the Bennington, Bon Homme Richard, Hancock, Hornet, Intrepid, Kearsarge, Lake Champlain, Randolph, Shangri-La, Ticonderoga, Wasp, and Yorktown. They now displace 33,000 tons, as compared with their original displacement of 27,100 tons. It is still proposed to modernise a further six of the original Essex class into the Oriskany class, leaving only the Antietam, Bunker Hill, Franklin, and Leyte in their original form. These four are being operated as support carriers for anti-submarine duties, the remainder being attack carriers for fleet or task force work.

The small carrier Belleau Wood, of 11,000 tons, has been transferred to France on loan for five years. She is a sister ship of the Langley, which was transferred to France in 1951 under the Mutual Defence Assistance Programme.

The Leyte was damaged on October 6, 1953, by an explosion in one of her hangars, followed by fire. There was fairly serious loss of life. The ship was undergoing a refit in the Boston Naval Yard at the time.

CRUISERS

It was announced during the year under review that the heavy cruiser Los Angeles, of the 13,600-ton Baltimore class, was to be taken in hand for conversion to a guided missile ship. Of this class the Boston and Canberra are already undergoing a similar conversion, while the Bremerton, Columbus, Helena, and St. Paul are being fitted with improved anti-aircraft armament, consisting of the rapid-firing 3-inch gun developed by the U.S. Navy. In order to help in meeting the reduced naval budget of the current fiscal year, the Quincy, of the same class, is to be taken out of commission and laid up in reserve.

The light cruiser Worcester, of 14,700 tons, is now used as a training ship for midshipmen. Of the smaller Cleveland class, of 10,000 tons, the Manchester has been re-armed with the 3-inch anti-aircraft gun in place of her former 40-mm guns, as also has the 6,000-ton Juneau.

It has been reported that on her speed trials last year the tactical command ship Northampton exceeded 33 knots. She is the ship that started life as a heavy cruiser of the Baltimore class but was almost completely redesigned during building to carry out her present role. She was commissioned on March 7, 1953, and has been reported as an exceptionally seaworthy ship and ideal for her present purpose.

DESTROYERS, SUBMARINES, ETC.

There have been no reports during the year of the destroyer leader Norfolk, which was completed in March, 1953, as a special "hunter-killer" ship. Her role, apparently, is to serve as flagship for the destroyer screens attached to carrier task forces. It has been stated that she carries almost every known device for anti-submarine work. On her official speed trial she was reported to have exceeded 30 knots by a handsome margin.

The Mitscher, also designated as a destroyer leader, was commissioned last year. She is one of a class of four, each of 3,675 tons and a designed speed of 34 knots. At her commissioning ceremony she was described as having a "nearly automatic target designation and push-button and finger-tip steering controls". It was also stated that she carried more electronic equipment than many larger warships. She is reported as designed to be a "long-range fleet type destroyer for anti-submarine duties", which appears to be a contradiction in terms. She carries, in addition to the latest anti-submarine weapons, two 5-inch guns in single turrets, one forward and one aft, and four 3-inch anti-aircraft guns mounted in twin turrets. The McCain, Lee, and Wilkinson of her class should be in commission this year.

Of the four new destroyers ordered last year, one has been cancelled in order to help in providing funds for the giant carrier Saratoga. The remaining three are to be named Forrest Sherman, John Paul Jones, and Barry. Their designed displacement is 2,850 tons and all three are due for completion in the autumn of 1955. The whole of the structure above the main deck, including the gun foundations, are to be of aluminium in order to give an increased metacentric height, and thus greater stability at sea.

The large Gearing class of destoyers are now being fitted with tripod masts instead of the pole masts with which they were built. The installation of additional radar aerials has made this necessary. Already 24 ships in this class have been converted to radar-picket destroyers and another 12 are to be taken in hand for a similar conversion. Another eight are to be transformed into "hunter-killer" units, which correspond to the British fast frigate conversions.

The event of the year in the submarine world was the launching by Mrs. Eisenhower last January of the Nautilus, the first submarine in the world to be driven by atomic power. As she slid down the ways it was possible for the first time to estimate her size and from her appearance she looked to have a surface displacement of well above 3,000 tons. She looked to be very beamy, with a tall, slim, streamlined conning tower and her propellors housed in fins on her stern.

The nuclear reactor, being too heavy for the slipway, was installed after her launch. It uses Uranium 235 as a thermal reactor with water coolant, the resultant steam being used to provide the actual motive power through conventional turbines. She is said to be able to dive in safety down to

700 feet. Estimates of submerged speed vary from 20 to 30 knots, while the radius of action is measured more in terms of the endurance of her complement rather than in miles. It has been stated that she carries fuel for two months cruising non-stop. There is, of course, no need for her to appear on the surface during this period unless for reasons of health or exhaustion of her crew. She is expected to carry guided missiles in addition to her normal torpedo armament. One report suggests that she will be ready for commissioning at the end of 1954.

Last year a second nuclear submarine, the Sea Wolf, was laid down, due to be launched in 1955. Her propulsive machinery differs from the Nautilus, being an intermediate neutron reacter cooled by liquid sodium. It has been reported that a third nuclear submarine is to be laid down shortly.

The two large radar-picket submarines, Sailfish and Salmon, are due to be completed this year. Of 2,425 tons surface displacement, they have a designed speed of 20 knots and are to be fitted with an aircraft control centre. Also due for completion this year are the two small boats T1 and T2, classified as target and training boats. With a displacement of only 250 tons, it has been suggested in naval circles in the United States that they would be used for landing small raiding parties. They are both streamlined to the typical Guppy design. There has been no further information during the year as to the progress of the closed cycle hydrogen-peroxide submarine which was building at Portsmouth Navy Yard.

Two submarines of the Balao class, the Hawkbill and Icefish, have been lent to the Royal Netherlands Navy for a period of five years. Both have had a Guppy conversion. The Tunny, of the slightly smaller Gato class, has been converted into a guided missile submarine. Like the Cusk and Carbonero, she fires "loons" from a ramp fixed to the after casing.

Among the many smaller craft being built are five patrol motor gunboats, 10 more Agile-class minesweepers, 20 new auxiliary motor minesweepers, and 54 shallow-draft minesweeping boats. These latter are to be carried in larger ships, still in the design stage, or in existing LSTs, fleet tankers, etc., to the theatre of operations where they will be employed in sweeping a path for landing craft.

The new tank-landing ships, 15 of which are under construction, are all due for completion this year. They are Diesel-driven ships, armed with a single 3-inch gun, and have a designed speed of 15 knots. Four new dock-landing ships of about 5,250 tons are under construction in a private yard at Pascagoula, Mississippi, and should be commissioned next year. Also under construction is an inshore fire-support ship of 1,200 tons, to be armed with a battery of rockets. Thirty-eight small landing craft of 180 tons displacement have also been ordered and should be making their appearance shortly.

NAVAL AVIATION

About the only branch of the United States Navy which has not suffered from the restricted naval budget is the air arm. Side by side with an increase in numbers has gone the development of new types, and the U.S. Navy now operates some of the most advanced aircraft in the world.

Perhaps the most outstanding machine of the year is the Convair XF2Y-1

Sea Dart, which made its first flight in April, 1953, and was given a public demonstration at San Diego in July. This is a twin jet delta wing fighter seaplane with retractable "hydroskis", fitted with two Westinghouse J.34 turbojet engines. Although details of its performance are still on the secret list, it has been officially stated that it can fly well above the speed of sound.

Wings and fuselage are both waterproof and the jet air intakes and exhausts for the two engines are set high up in the fuselage, to be well clear of any spray thrown up in the wash. Photographs of the Sea Dart show it floating at rest with its wings almost touching the water. Another attribute is that, after landing on the water, it can taxi to a ramp and up it into a hangar without damage to its skis. It has a length of 41 feet 2 inches and a span of 30 feet 6 inches.

The two versions of the Grumman XTB3F Guardian anti-submarine plane are to be replaced by a new machine, of which no details have yet been released. The Guardians had to hunt in pairs, one being known as a "hunter", the other a "killer". Grumman are developing a new anti-submarine plane, the S2F-1, presumably in replacement of the Guardians. Another new anti-submarine machine is the Bell XHSL-1 helicopter, a large tandem-rotored craft big enough to carry a very elaborate electronic equipment, as well as asdic and sonar equipment which can be lowered into the water while the helicopter hovers, and a full equipment of the latest anti-submarine weapons. This aircraft made its first flight in 1953 and is now in the production stage. The redoubtable Lockheed Neptune, of course, is still in use for anti-submarine purposes.

Another naval fighter in production is the North American XFJ2B Fury, of which the performance figures have not yet been made public. It is armed with four of the newly designed 20 mm. cannon and the new naval gunsight.

A new carrier-based bomber is the Douglas A3D-1, at the moment of writing not yet given a distinctive name. This is a twin-jet swept wing machine, fitted with two Pratt and Whitney J.57 engines. They carry a crew of three and can operate with torpedoes or bombs "of all descriptions", which is taken to include the small atomic bomb mentioned by Admiral Fechteler when talking about Korea last year.

Another new machine developed for the Navy is the McDonnell XCH-1 "flying crane", a ship-to-shore helicopter capable of lifting extremely heavy weights, or large quantities of stores in pods. In this aircraft the large rotor is driven by turbojets at each rotor blade tip.

Much in the news during the year under review have been the Douglas D558-2 Skyrocket and its successor, the Douglas XF4D-1 Skyray. The Skyrocket set up a new height record of 83,235 feet, but only after being released from a Boeing P2B-1 carrier aircraft at about 35,000 feet. The Skyray set up two new world's speed records, 753·4 miles per hour over a straight course, and 728·1 miles per hour over a 100 kilometre closed course. The Skyray is a delta-wing tailless machine and is being developed as a supersonic carrier-based interceptor-fighter. The machine in which the speed record was set up was fitted with a Westinghouse J40WE8 engine with afterburner, developing 22,000 thrust horse power. The production models are to have Pratt and Whitney J54 engines.

FRANCE

The old battleship Lorraine and the cruiser Duguay-Trouin have been sold for scrap. Both these ships were in Admiral Godfroy's squadron which was demilitarised at Alexandria on the fall of France in 1940. Both later joined the Allied forces at sea in 1943 and took part in the landings in Southern France in 1944.

The extensive programme of new construction spread over the five years 1949–1953 is now beginning to bear fruit, but it will be some years before the whole of this harvest is garnered. In the meantime the French Navy consists of an assortment of ships largely acquired from other nations, and in the present active fleet appear many which originated in Great Britain, the United States, Italy, and Germany, a fact which makes any approach to standardisation extremely difficult. It is, too, a matter which has a depressing effect on morale, for the French Navy has always had a fierce professional pride in the excellence of its naval architecture, and any idea of dependence on richer neighbours in the matter of warships is one that is deeply resented by this justifiably proud nation. While the present building programme goes some considerable way towards replacing obsolescent craft, it is only in the smaller categories that it is being effective, for with the single exception of an anti-aircraft cruiser included in the 1953 programme, nothing larger than a 2,700-ton destroyer is being built.

A second American aircraft carrier has been acquired during the year by gift from the United States. This is the Bois Belleau, formerly the Belleau Wood, an 11,000-ton sister ship to the Langley, already serving in the French Navy as the Lafayette.

The De Grasse, which was due to begin her acceptance trials at the end of 1953, is at the time of writing still not in commission, but may well be so by the time these notes appear. The second anti-aircraft cruiser, mentioned above, is to be built in Brest Dockyard, but no completion date has yet been announced. Like the De Grasse, she will carry 16 5-inch A.A. guns in twin turrets, but the scale of her armour protection will differ considerably. Provision is being made during her building for launching facilities for guided missiles, should the development of these as anti-aircraft weapons be sufficiently forward at the time of her completion to warrant their incorporation, and she will also carry a platform for the operation of a helicopter.

The first five ships of the new fast A.A. type, known as *escorteurs de première classe* were launched in the summer of 1953, and a sixth is due to be launched this year. According to the official programme, six more should take the water this year. Although originally known as anti-aircraft ships, they are in fact dual purpose and equally valuable in an anti-submarine role. The five so far launched are the Cassard, Chevalier Paul, Surcouf, Kersaint, and Bouvet, and the other seven due this year are the Dupetit Thouars, Maille-Breze, D'Estrees, Vauguelin, Casabianca, Guepratte, and Du Chayla. Five more of this class are due under the 1953 programme.

The first four of the *escorteurs de deuxième classe* have been launched, and nine more are expected during the course of 1954 and 1955. These are frigates of 1,310 tons armed with, in addition to the normal anti-submarine weapons, rockets and homing torpedoes. The 1952 and 1953 building programmes call for a further nine ships of this class.

The first two of four ocean-going submarines were due to begin trials this year, the remaining pair being expected in 1955. Based on the German Type XXI U-boat, it has been reported that these boats are being built in seven prefabricated sections of 30 feet each. No details of expected performance have been given, but from a preliminary description they appear to be normal type boats fitted with Schnorkels. Their names are Dauphin, Marsouin, Narval, and Requin. The 1953 building programme also allows for two small submarines of 400 tons surface displacement, apparently based on the American "submarine-killer" design.

Large numbers of coastal and inshore minesweepers are being built under "off-shore" arrangements, and about eight of the first coastal types have been launched. Most of these have gas-turbine propulsion, though a few have special light Diesels. In addition to those being built, 36 others have been transferred to France by the United States, the normal AMS type of 375 tons. Also being built in France under "off-shore" funds are nine small patrol vessels, of which three are expected to take their place in the French Navy, the remaining six being built for other N.A.T.O. powers.

RUSSIA

The defence budget for 1953–54 was announced as 110,200,000,000 roubles, or £9,839,000,000 at the official exchange rate. This is a slight reduction on the previous year, but an American State Department official pointed out there are many "concealed items of defence expenditure over and above the total given in the budget." Such items as atomic weapons, military training, and the expansion of war production facilities are not, it is understood, included in this figure.

The new cruiser Sverdlov, seen at the Spithead Naval Review in 1953, is larger than was estimated last year. Her displacement works out at about 16,000 to 17,000 tons, and she carries 12 5·9-inch guns in four triple turrets and 12 3·4-inch in six twin mountings. She is also fitted with ten torpedo tubes in two pentad groups. The fact that, on this displacement, she mounts no guns larger than 6-inch points to a very considerable range of action. The smaller Tchapaev class cruisers also carry 12 5·9-inch guns with 5,000 tons less displacement, and it is reasonably certain that the extra tonnage of the Sverdlovs is devoted to fuel capacity. This makes it unlikely that they are designed for use in the Baltic or Black Seas, where long endurance is of little value, and it is probable that they are earmarked for service in the Northern and Pacific Fleets. In August, 1953, one of these cruisers was seen passing through the Great Belt and obviously *en route* for the north. It is believed that a further seven of these Sverdlov cruisers are now completing (at least two, indeed, are in commission besides the Sverdlov herself), while another is known to be building at Molotovsk.

Few details are known about the new Stalin class of destroyer, except that they will be larger than the Ognevoi boats, 2,500 tons as compared with 2,000 tons, and that they will carry six 5·1-inch guns and nine 21-inch torpedo tubes in triple mountings. To eyes which are accustomed to Atlantic weather, all these Russian destroyers seem a bit on the fragile side. It is very noticeable that, in their general outline, they approximate very closely to Italian designs, and have the Italian predilection for speed at the expense of robustness. The standard Soviet destroyer speed is 38 knots, which can only be achieved by the sacrifice of some ability to keep the seas in heavy weather. Russia possesses over 100 modern destroyers of various types, and at least six of the large Stalin class are known to be building.

The Russian submarine fleet is believed to number some 360 units, of which about 200 are small coastal types unsuitable for extended Atlantic operations. Were Russia to obtain the use of bases on the Atlantic seaboard, however, these small boats could prove a considerable nuisance, though few of them are believed to be fitted with modern electronic or asdic devices.

The remaining 160 submarines consist mainly of the "K" and "S" classes, together with such new boats as have been built since the war. The "K" and "S" submarines are long-range boats with a radius of action of about 10,000 miles, but are conventional submarines of fairly low underwater speed. Most of them have been adapted for minelaying and some are fitted with Schnorkels.

Little is known about the new submarines recently built and building, apart from the fact that they are large, long-range boats. It would, however, be wishful thinking to belittle in any way the scientific and technological knowledge of the Russian nation and it is a reasonably safe assumption that these new boats are probably as far advanced in design, with the probable exception of nuclear propulsion, as any in service with the fleets of other nations. The "Improved K" class, submarines of about 1,600 tons surface displacement, are believed to have an underwater speed of 17 to 18 knots, and the new boats are stated to be an improvement on the "Improved Ks".

The strength of the naval air arm is stated to be at least 3,000 aircraft, but it remains entirely shore based and its personnel bear army rank. It is difficult to understand the strategic reasoning which demands so large a naval air element and yet accepts the handicap of comparative immobility in the lack of even a single carrier. The aircraft concerned are modern and highly efficient, but their naval purpose would appear limited to defence alone. (*See also Chapter VII.*)

ITALY

The two Garibaldi-class cruisers, which have been undergoing extensive refit under the Italian five-year programme, are expected to be back in full service at the end of the present year. They are being converted as anti-aircraft cruisers and are being largely re-armed. One effect of this conversion is that they are losing their six above-water torpedo tubes and instead carry additional 3·9-inch A.A. guns.

The two small San Giorgio cruisers, now rated as destroyer leaders, are also due for completion at the end of this year. Of 3,500 tons, they will appear as dual-purpose ships, anti-aircraft and anti-submarine, and in addition to fairly extensive A.A. armament will also carry a squid. The two large destroyers of 2,775 tons, Impetuoso and Indomito, are still on the building slips but should be ready for launching before long. They will be similar ships, on a smaller scale, to the two San Giorgios.

The two new frigates which are being built under the five year programme are due for completion late this year. They are of 1,500 tons with a designed speed of 26 knots, and carry a squid in addition to normal gun armament. A third frigate is being built under American "off-shore" terms, but its destination has not yet been made public. The United States has also ordered eight corvettes from Italian yards, but like the frigate it is not known to which navies they will be allocated. Some 20 minesweepers, magnetic and coastal, are also under construction.

The possession by Italy of a submarine was revealed last year in the official report of the combined exercises carried out in the Mediterranean. In fact she has two, both of which have been reconditioned from those laid up under the terms of the Italian peace treaty. They are the 745-ton Vortice, of the Flutto class, completed in 1943, and the 645-ton Giada, of the Acciaio class, completed in 1941. A third submarine is stated to be under construction in an Italian shipyard, but no announcement has been made of her size. Two more are to be transferred from the United States, approval having been given by Congress in 1953.

OTHER EUROPEAN COUNTRIES

BELGIUM

A new construction programme for Belgium was announced recently, under which one or more destroyer escorts, 15 motor minesweepers, and two troop transports are to be built. No announcement of the ordering of any of the ships of this programme, apart from the minesweepers, has yet been made and it is not thought that any have yet been started. Sixteen new minesweepers for the Force Navale are being built in the United States, and eight in Belgium, these are the normal N.A.T.O. AMS type of 370 tons. All 24 come from mutual defence assistance funds. Two new patrol craft of uncertain tonnage, are under construction in the United States.

DENMARK

A number of small craft for the Royal Danish Navy are building both in that country and in the United States under the mutual assistance programme. The most important among them are four new patrol vessels, two of them being built in Denmark and two in the United States. Details are lacking, but they are expected to be of about 500 tons displacement carrying small anti-aircraft guns and possibly a squid or hedgehog. Six new motor torpedo boats are also being built to bring the total up to 24. All these craft are expected to commission at the end of this year or during 1955.

The three new submarines mentioned in these notes last year have still to make their appearance. In the meantime the Springeren (the former British P.52) has been modernised and fitted with a Schnorkel. The remaining two submarines, the Saelen (formerly H.M.S. Vortex) and the Storen (ex-H.M.S. Vulpine) are to be taken in hand for similar modernisation.

Under the N.A.T.O. "infrastructure" programme two new naval bases are to be constructed at Korsör and Frederikshavn, for which Denmark is to contribute 52 million kroner (£2,500,000).

GREECE

The eight British Hunt-class frigates, which have been on loan to Greece since the end of the war, have now been given to that country as a gift. For some time past they have been laid up and in need of substantial repair. It has been announced that the United States has expressed her willingness to finance the essential repairs required to put these ships back into full commission. Two of the British submarines on loan, the Amfitriti (ex-H.M.S. Upstart) and the Xifias (ex-H.M.S. Untiring) have been returned, leaving four others still on loan.

It has been decided to reduce very substantially the British naval mission to Greece, which has been operating in that country since 1909. Much of Greece's naval skill has been due to the patient work of this mission, but its cost has proved recently rather beyond the country's ability to pay. It is reported that there is also a feeling in Greece that a reduction in the British naval mission would lead to an extension of United States advisory influence which might bring with it substantial reinforcements for the Greek Navy.

New naval bases are being constructed by the United States in Crete and on the Ionian Islands. While these are designed to strengthen the N.A.T.O. organisation in the eastern Mediterranean, and are thus available for use by other N.A.T.O. powers, they will of course mainly concern the Greek Navy and should add considerably to its overall flexibility.

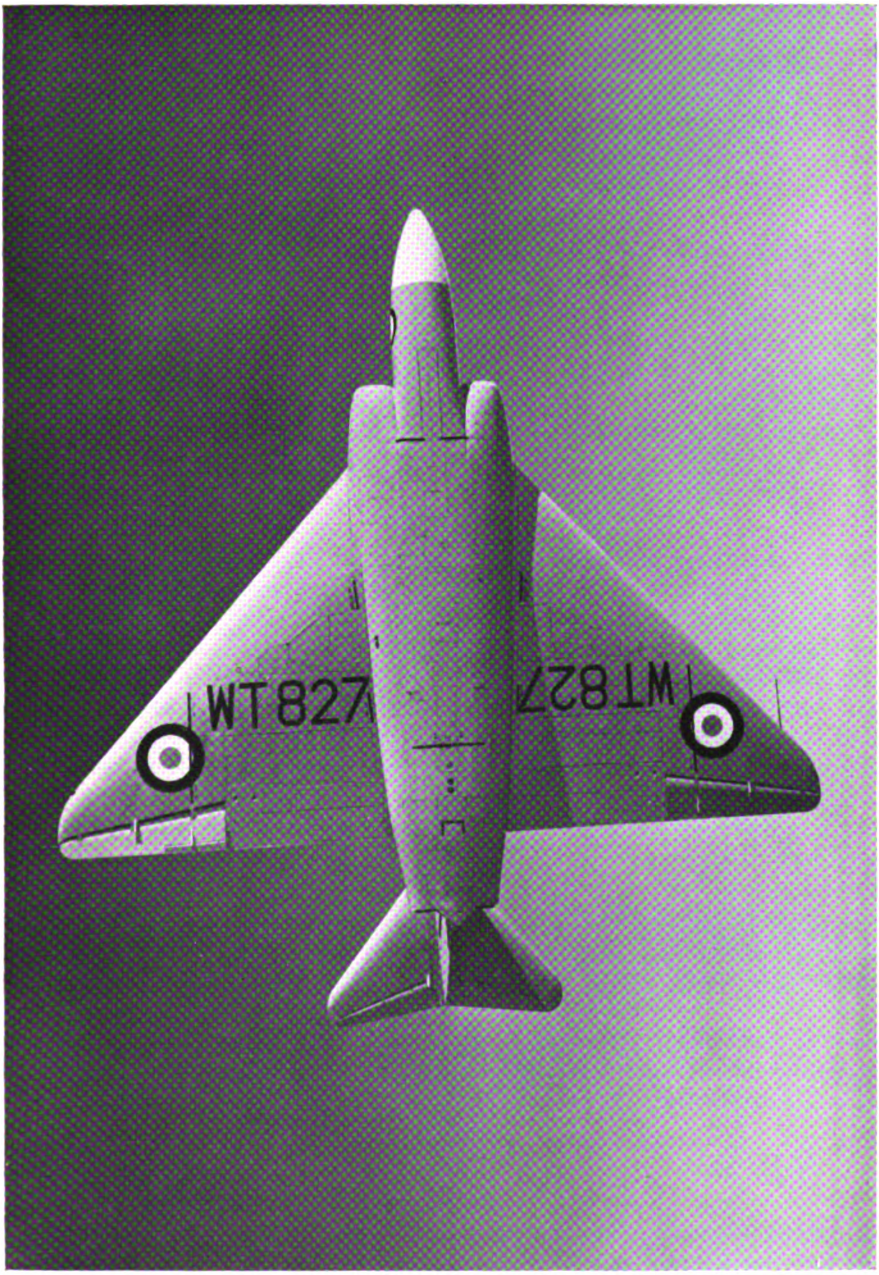
NETHERLANDS

The two new cruisers, De Ruyter and De Zeven Provincien, were commissioned at the end of 1953 in the presence of Queen Juliana, and are now in full service.

The 12 new destroyers, ordered in batches of six, should be ready in 1954 and 1955. Most of the first six are now nearly complete. Eight of the 12 are ships of 2,450 tons displacement, armed with four 4·7-inch guns and normal anti-submarine weapons, but no torpedo tubes. They have a designed speed of 30 knots. The remaining four are smaller, of 2,160 tons, but carrying similar main armament. Their speed is expected to be about four knots slower.

The four new submarines which are being built at Rotterdam and Schiedam promise to be boats of extraordinary interest in design. In order to obtain extreme diving depth they are being constructed with three communicating cylindrical pressure hulls within the normal casing. No estimates of their capabilities have yet been made public, but they are expected to be completed with the modern requirement of high submerged speed. During the past year two British T-class submarines on loan have been returned. These are the Zeehond (ex-Tapir) and Dolfijn (ex-Taurus). The remaining two of this class have been purchased. Also acquired are two Balao-class boats from the United States, the Walrus (formerly Icefish) and Zeeleeuw (formerly Hawkbill). Both these submarines are Guppy conversions.

Some 37 new minesweepers are being added to the Royal Netherlands Navy, 32 being built locally (18 by order of the United States under the Mutual Defence Assistance Programme) and five transferred direct from the United States Navy. Other small craft coming forward are seven



Gloster Javelin GA.5, two Armstrong-Siddeley Sapphire turbojets

patrol vessels, three of them Dutch built with mutual defence funds and four transferred direct from the United States.

Additional work is being carried out at Den Helder to make it a base capable of sheltering the entire Dutch fleet. New moles are being constructed to enlarge the harbour area. The final date of completion is now reported to be 1957.

NORWAY

There have been no reports yet that the three submarines, which are to be built under the five-year programme (1951–55) have yet been laid down. Under construction are six of the 13 motor torpedo boats envisaged under this programme. They are to replace the British Fairmile types purchased after the war which are now approaching the end of their useful life. A small number of coastal minesweepers are also to be acquired, five by local building and two from U.S. yards. All seven are being built under the mutual assistance programme.

PORTUGAL

The only change in the Portuguese Navy during the year under review is in the acquisition and building of a small number of minesweepers. Four offshore type are being built for Portugal in the United States with mutual defence funds. Five coastal minesweepers of the standard design have been transferred from U.S. sources, their names being Angra do Hekoismo, Horta, Ponta Delgarda, Santa Cruz, and Vila do Porto. Three more of the same type are building in the United States and should be delivered later this year or early in 1955. Three small submarine chasers are also under construction in the United States for the Portuguese Navy. Like the minesweepers, they are financed under the mutual defence scheme.

ROUMANIA

The two destroyers appropriated by Russia at the defeat of Roumania have now been returned. They are the Letuchi and Likhoi, each of 1,785 tons. Both are comparatively old ships, dating from about 1930, and must now be of doubtful naval value.

The only comparatively modern ships in the Roumanian Navy are two submarines of 1942 vintage, the Marsuinul and Requinul, the minelayer Amiral Murgescu, built in 1939, and a few motor torpedo boats of the same age.

SPAIN

The heavy cruiser Canarias has completed her extensive refit and is now in service again. The familiar trunked funnel has disappeared and she now has two of conventional design in its place. It is reported that her 8-inch guns can now be given an elevation of 70 degrees.

The nine destroyers of the Oquendo class have now been reduced to three, the Blasco de Garay, Bonifaz, Gelmirez, Langara, Marques de la Ensenada, and Recalde having all been cancelled during 1953. No completion dates for the three remaining ships of this class have been reported and it is not certain that all three have, in fact, been laid down.

The smaller Audaz class progress slowly, the four launched in 1951 having run their trials two years later. The remaining five ships in this class have not, at the time of writing, been launched.

The first of the new corvettes, the Atrevida, was launched at Cartagena in 1953, and one more of this class of six should by now have left the building slip. The designed speed of these ships is reported to be 18 knots and they are expected to carry a squid. There has been no information during the year as to the progress, if any, of the four new submarines building at Cartagena. The third submarine of the D class has been completed and is now in commission.

The first of the seven new minesweepers has run her trials and is believed to be in commission. The remaining six should not be far behind her.

There has been some speculation in Spain as to the effect on the Spanish Navy of the recent agreement with the United States for the use by that country of Spanish naval bases. While concrete details are lacking, it has been suggested that the Navy will be substantially reinforced with ships and technical equipment.

SWEDEN

The four new destroyers under construction have been given the names of Gastrikland, Halsingland, Ostergotland, and Sodermanland. These are ships of 1,880 tons. The two larger destroyers being built, the Halland and Smaland, should by now be approaching completion. Both were launched in 1952. These two 2,600-ton destroyers are fitted with two fully automatic gun turrets each mounting two 4·7-inch anti-aircraft guns. The six old destroyers of the Goteborg class are to be converted to fast anti-submarine frigates.

No further information is available as to the progress of the six projected submarines under the 1951 and 1952 programmes. Three have been laid down and should by now be about ready for launching, but it is not believed that a start has yet been made on the second three. A new mine-layer of 2,000 tons is projected under the six year (1952–58) programme but has not yet been laid down.

The old armoured ship Sverige, of 7,200 tons, built in 1921, has been scrapped.

TURKEY

The 1,525-ton submarine Dumlupinar was rammed and sunk in the Dardanelles in 1953 with heavy loss of life. She was one of the five Balao class boats transferred to Turkey by the United States.

The new naval base at Iskanderun was completed by the United States during the year under review and handed over to the Turkish Navy. It is understood that one or two subsidiary bases are under construction and will be similarly handed over on completion.

YUGOSLAVIA

Conflicting reports of the state of the Yugoslav Navy make it extremely difficult to obtain an authentic picture of its composition. Although it has been reported that two new destroyers are building, there is no reliable indication yet whether they have been laid down. It is believed that the other new destroyer, named Split, laid down as long ago as 1939, is still awaiting final completion. Two more ex-Italian destroyers are now in commission, making four in all. These are the Biokovo (ex-Aliseo) and Triglav (ex-Indomito).

Equally obscure is the situation in regard to submarines. Reports indicate that two Italian boats have been salvaged and are refitting, but their authenticity remains a matter of doubt. One of them is said to be named Nautilo.

AMERICAN COUNTRIES

ARGENTINA

The two improved King-class frigates, Azopardo and Piedra Buena, which have for long been building at Rio Santiago, have still to be completed. As these two ships are of no more than 1,200 tons, their progress would seem to be extremely leisurely. They have both been building now for some years, it is believed.

BRAZIL

Little change has been reported in the Brazilian Navy during the year under review. Three small coastal-patrol vessels are being built for Brazil in Holland, and there are reports that the same country will build ten more similar vessels for coastguard duties.

PERU

The two new submarines Lobo and Tiburun, which are being built for Chile by the Electric Boat Company at Groton, are boats of 825 tons surface displacement, carrying four bow and two stern tubes. Completion date is 1954 and, subject to satisfactory trials, they should both by now be delivered. The tank-landing ship Chimbote, formerly the U.S.S. LST 283, has been purchased from the United States and added to the Chilean Navy. She is of 1,625 tons. A landing craft for amphibious training purposes has been ordered in the United States.

URUGUAY

The former H.M.C.S. Arnprior, a Castle-class frigate, has been purchased from Canada for training purposes. Her name in the Uruguayan Navy has not yet been announced.

VENEZUELA

The second of the three modern destroyers being built for the Venezuelan Navy by Messrs. Vickers Armstrongs at Barrow-in-Furness was launched in June, 1953, and named Zulip. The third was laid down on the same day and is to be called Aragua. Details of their armament were given in these notes last year. It has been announced that three more destroyers have been ordered in Italy, but details so far are lacking.

It has been reported that Venezuela is to construct a naval base at Turiamo, but it is not known when work on it will start.

OTHER COUNTRIES

BULGARIA

It has been stated that the three ancient torpedo boats Derzki, Khrabri, and Strogi are being converted for minesweeping duties. Six other small craft fitted for minesweeping are believed to have been transferred to the Bulgarian Navy from Russia.

CHINA

Little change is reported from the two Chinese navies, Nationalist and Communist. Each has a more or less equal share of the original fleet, strengthened on the Nationalist side by gifts from the United States and on the Communist side by gifts, mainly ex-Japanese, from Russia. One report from Communist China states that the former British cruiser Aurora, renamed Chunking, which was sunk by bombing at Hulutao, has been raised and is being refitted, but such a report should be received with caution until definite confirmation can be received. The Chunking was originally given to Nationalist China by Great Britain, but changed sides in 1948 when her crew mutinied and took her over to the Communists.

COLOMBIA

A third frigate, a sister ship of the Almirante Padilla and Capitan Tono, has been acquired from the United States. She has been named Almirante Brion and was formerly the U.S.S. Burlington.

INDONESIA

The six small patrol vessels building in Holland for the Indonesian Navy are expected to be completed by the end of this year. They will be known as the Balam class, but details of tonnage and armament have not yet been announced. A sail-training ship, barquentine rigged, is being built in Germany and was launched at the beginning of this year.

JAPAN

The rebirth of the Japanese Navy took place last year in earnest with substantial gifts from the United States. Until then the various small craft operated by Japan were limited to police duties. During 1953 the United States transferred 18 frigates, of 1,430 tons each, and 54 small gunboats of 227 tons. Large numbers of medium and small patrol vessels and minesweepers have also been transferred.

To be built are five "defence vessels", ranging from 1,000 to 1,500 tons, while the declared naval aim is a force of some 300 destroyer type ships, which presumably would include frigates, escort vessels, and probably large patrol vessels.

"SPINDRIFT"

CHAPTER XXVII

"THE TANK AND ITS ANTIDOTES"

By Major-General L. O. Lyne

(1) A HISTORICAL SURVEY OF THE DEVELOPMENT OF ARMOUR

Mobility has always played a decisive part in war. The armies of Napoleon achieved their spectacular results in Northern Italy in 1896 because they could out-march and out-manœuvre the cumbersome Austrian formations trained on the conventional lines of that period. The French and Allied cavalry showed during the long drawn out struggle for domination of Europe that both in mobile operations and in shock action they were a battle winning factor, though the British square demonstrated how highly trained infantry might successfully repel a cavalry charge.

For a hundred years the cavalry retained their pride of place both for mobile operations and also as the principal attacking arm in the set-piece battle. Already, however, in the latter role the odds were swinging heavily in favour of the defence as the accuracy and performance of the fire arm improved. The smooth bored musket gave place to the grooved barrel rifle and the first automatics made their appearance. It was not, however, till the first Great War that the immense fire power and accuracy of the machine gun, combined with the defensive strength of prepared positions and barbed wire, sounded the final death knell of the cavalry. In the more favourable conditions of the Middle East against the hard fighting but ill-equipped Turkish Army, General Allenby's cavalry were still able to exert a major influence on the campaign, but in France the stalemate was complete.

The first tanks appeared on the Western Front in 1917, a British invention aimed primarily at breaking the deadlock by giving the infantry the necessary close fire support to put them on their objective and in so doing to dominate and destroy the enemy defensive positions. They suffered from the inevitable growing pains of any new equipment but by August 8, 1918, they had developed sufficiently to play a leading part in the battle which led to the final defeat of the German Armies in the West. It is interesting to recall that six weeks later at Megiddo General Allenby, by perfect timing and use of the speed and surprise which his superior cavalry forces gave him, annihilated the Turkish Seventh and Eighth Armies. The last great cavalry action had been fought, for already the old order was giving way to the new. The tank had proved itself in battle. The machine gun and the barbed wire protected trench system which had stopped the cavalry were no match for its armoured successor.

Between the two wars the small band of British officers whose vision and technical ability had brought the tank into existence did their utmost to ensure that development continued and that we kept the lead we had established. But the dice were heavily weighted against them. Not only was the mentality of many of the senior officers of the inter-war years much averse to such radical changes as mechanisation in general and the tank in particular would entail if applied on a large scale, but the prohibitive cost of such changes won them ready support amongst the civil servants and politicians responsible for the financial aspect.

It was then left to the Germans when they began the expansion and rearmament of their army to profit particularly from our early work and experience. It was they who, appreciating the possibility of getting quick results with fast moving armoured forces, developed the tank and its employment so that by 1939, instead of as in 1917 being a supporting arm with the role of helping the infantry get forward on to their objective, it became in itself the main arm of their mobile divisions. All arms, including the infantry, were there only to help the tank forward and to prevent its getting pinned down.

Thus, the vision of the new mobility which the ambitious British armoured plan for the unfought campaign of 1919 on the Western Front had prepared for was brought to reality twenty years later by the German Army.

Tanks, supported by highly trained mobile infantry and overwhelming air power, gave the Germans in the opening year of the war the necessary mobility and punch to overrun Europe. In May, 1940, Guderian's XIX Corps, made up of three armoured divisions, after breaking through the fortifications on the Belgian frontier, covered 400 miles in seventeen days to reach the Channel coast and virtually complete the defeat of the French Armies in the West. He was to repeat these successes in the early fighting against Russia.

In 1940 in the Western Desert Wavell, outnumbered by the Italians by ten to one, decided to take the offensive. Making the maximum use of the mobility and desert worthiness of the Seventh Armoured Division, he captured the whole of Cyrenaica and a quarter of a million prisoners at a cost of a few hundred casualties.

Though the Western Desert provided a specialised instance of armoured warfare more akin in some respects to naval tactics than to the normal run of land campaigns on account of the particular problems posed by the desert, the tank proved throughout the dominating and decisive arm.

Such indeed was the case in all the major theatres of operations except where such mountainous country, as in Italy, or swamp and jungle as in Burma made tracked movement difficult and the tank reverted to its secondary role of support for the infantry where the nature of the terrain made it possible to operate at all.

The use of special armour, such as D.D. tanks, A.V.R.E.s, flame throwers, flails, etc., made the Normandy landings possible. They played their part in a supporting role throughout the intensive fighting to break out from the Bocage country. After this, American and British armoured divisions chased the retreating German Armies and made a further stand before the frontiers of Germany were reached, impossible. The advance of Patton's Army captured the imagination, but the British XXX Corps' thrust from the Seine to Antwerp, a distance of 230 miles, in six days, was a fine achievement and prevented the destruction of Antwerp. Over a thousand tanks in four armoured divisions and several independent armoured brigades led the final advance of the British Second Army after the crossing of the Rhine.

Again, on the Eastern front, we saw armoured forces in operation on a scale which dwarfed the fighting elsewhere. Their armoured formations, brilliantly handled, gave the German Armies the punch and mobility to make their deep initial penetrations and to isolate and encircle large Russian forces. Russia, however, proved too vast and its resources of men and materials too great to suffer the fate of France. When the same inexorable forces of nature which had proved the undoing of Napoleon came to the assistance of the unbroken will-power of the Russian people and the Russian steam roller began its move westwards, the spearhead of its advance was again tanks.

The use of armoured divisions by both the Germans and ourselves had shown once again that speed, boldness, and offensive action are the true requisites of such a mobile force. Its job is to destroy the enemy directly or by manœuvre and encirclement to force his surrender, while defensively it must use its great fire power and mobility to delay and disrupt an advancing enemy and then to counter-attack.

The tank then had proved itself a battle winning factor in the last war, probably equalled only by the use of aircraft in support of ground forces.

The pattern was almost always the same after the early German victories. Intensive fighting to overcome anti-tank obstacles and to blast a way through heavily fortified prepared positions to make a passage through which the armoured divisions could advance to make full use of their mobility and fire power to render the whole enemy position untenable. In this break-in battle the infantry had the primary role, supported by artillery, air, armour, engineers, etc. Immediately the battle became fluid the armour waited its opportunity and exploited the situation, both to unlodge the enemy from his whole defensive area and also to chase and harry him and, if possible, complete his destruction. We see this at Alamein, in Normandy, in the German attack in the Ardennes and in the final allied assault across the Rhine, to mention only a few examples.

It was inevitable that one of the main objects of both sides was to crush and limit the power of the tank. Development of anti-tank weapons and devices was given a high priority and made considerable progress.

(2) THE ROLE OF THE TANK

Having considered in general terms the part played by armour in the last war, let us now turn to examine the role of the tank in rather more detail.

As pointed out already, the tank has two primary functions. Its first and most important role is as the dominating arm in mobile operations. The second requirement is to support and assist the infantry in the set-piece battle. Though this may be described as a secondary role, without its successful outcome the opportunity for mobile exploitation will never come.

The policy of the British Army, both during the last war and today, is to carry out both roles with the same tank, the Centurion or its successor, the prototype of which has already been announced and which will have improved armour protection, greater engine power, and better cross-country performance in difficult going through lower track pressure. This use of the same tank in a dual role has much to commend it in an Army such as ours, where we shall always be short both of industrial potential and trained soldiers. There will never be enough tanks to go round and the importance of simplification of organisation, training, administration and reinforcement is very great. In fact, in the last war it allowed the independent armoured brigades, whose main role in the Normandy fighting had been close support of the infantry divisions, to join the armoured divisions when the stage for mobile exploitation was reached. This enabled us to deploy our maximum armoured strength in the pursuit.

A dual-purpose tank always runs the risk that it may be too slow for use as a cruiser tank with the armoured divisions and too under-gunned and thinly armoured to fulfil its task of close support of the infantry satisfactorily. The Centurion seems to have struck a fair balance here though it is undoubtedly a wise decision to add some heavy tanks with greater gun power and armour both to support the armoured division, particularly in a defensive role, and also to assist the infantry attack on any heavily defended position. A limiting factor, at any rate at present, on the overall weight of the heavy tank must be the bridge capacity in any likely theatre of operations. In Europe, both the civilian bridging and the field bridging equipment likely to be immediately available has an upper limit of some 70 tons, which means a 50-ton tank if it is to be carried on a transporter, or the full weight if it is to be used only on its own tracks, a very costly business in track wear or in loss of time if the heavy tank is to be removed from its transporter at each bridge and put on again at the other end.

There are some advocates of a much lighter tank than the Centurion for mobile operations, which would be fast, manœuvrable, and very reliable, splinter proof, and proof against small arms fire. It must, however, always be remembered that the armoured division, even after breaking through a main defensive area, will probably have to do plenty of fighting. Our experience after the Rhine crossing and during the advance to the Elbe showed that even a defeated enemy can fight very stubbornly in defence of his homeland. A tank crew must have more than "splinter proof" protection if they are to press home an attack resolutely.

Moreover, if each centre of resistance can only be overcome by calling up assault tanks from the rear, the momentum and immediate punch necessary to retain it will be lacking.

There is, however, probably a requirement for a tracked and armoured reconnaissance vehicle to supplement or even replace the road-bound armoured car. But this is for reconnaissance, NOT for fighting, and it should be called a reconnaissance vehicle and not a light tank, which name presupposes its capacity for a degree of offensive fighting which it does not possess.

There were developed during the war a number of special tanks for special purposes. The D.D. or amphibious tanks provided close support in the earliest stages for the invading infantry in Normandy, as the tanks were discharged from their carrying craft some way off-shore, "swam" ashore and were able to go straight into action. Such a development has greatly enhanced the power of the invading force in the first few critical hours ashore. Other types included the C.D.L., a tank carrying an armoured protected searchlight which could flicker and temporarily blind the defence, the Crab, a tank carrying a "flail" for exploding mines, and A.V.R.E. assault engineer units which handled a number of vehicles and machines designed to deal with various types of defences. These included flame throwing tanks and the armoured bulldozer, a most important member of the team. Most of these were developed directly as units of the 79th Division under the inspired leadership of General Hobart for the assault on the Western Wall. Not only did they prove their worth here but were in constant demand for the remainder of the campaign in North-West Europe.

The role of the tank then is to fight either as the dominating partner in a team in mobile operations or as close support for infantry in the attack against a prepared defensive locality. This latter requirement may entail development of specialised tanks to deal with special circumstances.

(3) THE TANK

The tank is a mobile gun platform mounting the most suitable and powerful gun, bearing in mind the necessity for good cross-country performance by its tracked chassis and reasonable protection for its crew. Many of the factors are conflicting. It is desirable to have as much armour or other protective covering as possible to give reasonable security to the crew and thus ensure high morale and also to prevent damage to the engine, gun parts, radio, etc.; but undue weight will limit track performance and may make many bridges unusable. Fatigue of the crew is always a factor to be kept in mind in view of the necessity to maintain the maximum momentum once armoured forces are on the move. Storage and consumption of petrol, oil and lubricants, and storage of ammunition, will govern the radius of action, which must be as great as possible. R/T and W/T facilities must be easy and foolproof to operate. The accuracy of the gun and the hitting power of the shell are of prime importance. Recent developments have greatly increased the accuracy of fire, particularly on the move. The prime object of all tank warfare must be to get the tank into position where its gun can prove decisive. The engine should be as quiet as possible; this is particularly important at night. The tank must have as low a silhouette as possible to enable it to make the best use of cover and prevent the enemy tank or anti-tank gun getting in first shot.

The modern tank, with all its equipment, takes much material and many man hours to produce, and replacements will always be a serious problem, even in an industrialised country such as ours. The same consideration applies to the provision of trained tank crews.

(4) ANTI-TANK WEAPONS AND OBSTACLES

Let us now consider the development of anti-tank weapons and obstacles, and to what degree they are likely to limit the offensive power of the tank.

(*a*) *The Anti-Tank Gun*

This may be semi-mobile, i.e. requiring a prime mover to hitch it up and change position, or self-propelled on a platform on tracks. If the latter, it has many of the characteristics of the tank, though armoured protection for the crew is considerably reduced and its radius of action much less.

Post-war developments have greatly increased the hitting power and penetration of anti-tank guns and the thickness of armour needed for protection against such fire; indeed, the modern anti-tank gun can penetrate any thickness of armour likely to be practicable on a tank. For such a gun, concealment will be a difficult matter.

Two probable developments may influence this matter. The penetrating power of recoilless guns and rockets is likely to be just as great as that of the more conventional gun of the last war. At present lack of accuracy is a disadvantage. This will be overcome and the greatly decreased weight will make the gun smaller and more mobile; but this will also apply to the tank, which can be reduced in size and weight in like fashion.

So far as resistance to penetration is concerned, it may well be that future developments in hard alloys and possibly plastics will give better results for less weight than the present conventional armour plating.

(*b*) *Missiles from Aircraft*

Really effective rocket attack on tanks requires a high degree of overall air supremacy and very well trained pilots. One should not, however, discount possible developments in this field, including the use of napalm bombs or similar destructive agents. Though lack of air superiority would inevitably greatly restrict armoured operations, particularly in so far as supply echelon movements are concerned, the fighter attack as such on the tank does not look like ever being a decisive factor, though its nuisance value could be considerable.

(*c*) *Short Range Anti-Tank Weapons*

The development of the hand operated short range weapon of the Bazooka type offers unlimited possibilities. Their proper use will, however, always require suitable close country and stout-hearted soldiers to man them.

(*d*) *Mines*

The anti-tank mine proved very effective in the last war in delaying tanks and in canalising their lines of movement. It is, however, entirely a defensive weapon and has the inevitable limitations of its kind. It can only prove more than a very temporary obstacle if the minefield is well covered by fire. The presence, real or suspected, of mines does, however, impose caution on the troops, which may well be as effective in slowing down movement as the mines themselves. It seems probable that improvements can be made in the performance of the mine, but nothing can alter its wholly passive defensive characteristics.

(*e*) *Other Obstacles*

Natural obstacles, such as mountains and rivers, limited the movement of tanks considerably in the last war. Even so, the appearance of even one tank at the right time and place in unfavourable going, such as the mountains of Italy or the jungle of Burma, often produced an effect out of all proportion to the actual fire power. The immense psychological effect of the appearance of armour unexpectedly against troops ill-equipped to resist it must always be remembered.

In a country such as Europe, the capacity of the bridge system for load carrying at present exercises a decisive effect on the overall weight of the tank and transporter and, as we have already said, this is limited to some 70 tons. It does not, however, seem to be a very far cry to the development of some form of "boosted" take-off over river obstacles by which the tank, with the aid of rockets, could be catapulted across to the other side. The introduction of unconventional guns or rocket weapons, and possible new lightweight protective materials, may also help greatly to reduce the overall weight. This, in itself, would be a help to movement in mountainous and soft going country.

(*f*) *Atomic Weapons*

It does not seem probable that the atomic tactical weapon will have much effect as an anti-tank weapon. Its threat will, of course, preclude close concentration, but this is less necessary for armour than for any other arm on account of its mobility. The tank crew should be more proof against the atomic missile, however delivered, than any other troops, though a direct hit would be fatal as in any other case. The probable effect of atomic weapons on tank tactics is a matter of great interest and importance and is dealt with subsequently under a separate heading.

(5) TRAINING

One of the lessons of the last war that had often to be re-learnt was the necessity for infantry and tanks, who are to operate together, having a period of training together before they are called upon to fight. Only in this way can real mutual confidence and trust be ensured between the tank crew and the infantry platoon. When they are "Bill" and "Jim" to one another, then the battle is more than half won. One of the difficulties which the British Army has to face is that there are never enough tank units to go round and they are bound therefore to be often changing from support of one infantry formation to another. None the less, the Higher Commander should never forget the importance of preliminary training together. Proper planning and ingenuity will often achieve the seemingly impossible in this respect.

The closest cooperation between tanks and infantry is just as important in the armoured division. Here the problem is usually easier and there is no excuse if they are not properly married up before the battle. We learnt much in this respect from the working of the German panzer battle groups.

Cooperation is also necessary not only with the air but with all other supporting arms, artillery, and Royal Engineers in particular. This applies equally again to the set-piece attack and to mobile operations.

The tank crew need both a high standard of individual training and also to work together as a team whose members are interchangeable in case of casualties. The tank has many ways of avoiding the knockout blow and delivering the same to his opponent. Mutual fire support by one tank sub-unit for another, covered lines of approach, the great accuracy and effect of stabilised tank fire, the use of smoke and night fighting are all means to this end. The faster, smaller and harder hitting the tank is, the better chance it has. But all will depend upon the men inside it.

(6) THE TANK IN ATOMIC WARFARE

It is probable that only the Soviet Union and the United States of America possess the industrial potential and atomic resources necessary to wage war on a world scale today, that is to say, face the consequences of atomic reprisal which an act of aggression might provoke. In the unlikely event of such an occurrence, it might be that the ensuing atomic attacks upon the industrial life of the country and homes of the people would put one or other of the chief combatants, together with their allies, out of the war in the opening stages, or at least so cripple its ability to continue the war as to bring an end to hostilities without any large engagement of the land forces. Such a result does not seem very likely and it seems more probable that it would be necessary for both sides still to exert their maximum effort to obtain a decisive land victory as quickly as possible.

It is now fairly clear that the use of atomic weapons must be expected in any fighting on land in the near future. How will this affect the tank and its use?

It would seem that, at any rate so far as the atomic bomb as we have known it in the past is concerned, the comparatively few in number which probably exist and their immense cost of production confines their use to such targets as great concentrations of troops and/or material. The Normandy beachheads or the concentrations before Alamein or the Rhine crossing would no longer be possible. On the degree that smaller and less costly atomic missiles can be produced will depend how small the concentration which will offer a worth-while target.

It is probable that the atomic missile could be delivered in one of three ways, by bomb from an aircraft, by rocket, or by shell from a gun. All might have great range and equal effect. Some at least then of the old advantages of complete air superiority may have gone, so far anyway as protecting great concentrations, such as that we mustered on the West bank before attacking over the Rhine, or the Germans adopted for their defensive at Alamein, is concerned. Concentration, both in attack and defence, must give way to controlled dispersion.

In offensive action atomic attack alone may not make the gap for the mobile troops, but it will certainly do a great deal to help, provided, as in every other such situation, immediate advantage is taken of the damage and confusion caused. A point arises here that it will be very necessary for the commander of the mobile force to be consulted with regard to the atomic target if he is to exploit the opportunity to the best advantage. The tank itself and its crew should be capable of passing unharmed through the area of damage.

The armoured formation will be lying back well dispersed before the atomic attack takes place, hidden up in carefully controlled dispersion by battle groups. When the time to advance comes then battle groups will move forward on independent lines of advance from their dispersed assembly areas to concentrate for the first time upon their main objectives which may be many miles distant past the area of atomic attack. This will call for careful timing and a high standard of training. The reaction of the enemy to our armoured movement should unbalance him and may well offer suitable targets for armoured attack or even further atomic action if his troops tend again to concentrate.

In defence, the armoured divisions may be sited in depth behind the forward defended areas held by infantry divisions. Any penetration by the enemy will give the swiftly moving dispersed armour the opportunity to move against the enemy and seal off his penetration. He will thus be forced to bring up his heavy equipment through the gap he has created and in so doing may well offer a suitable atomic target, after which the armoured divisions should have the chance to destroy the remaining enemy forces.

The possible pattern of land warfare in an atomic age seems then to point to the tank as indispensable in attack and defence. It does not mean, of course, that all the anti-tank weapons and obstacles will not be further developed. Rather the reverse as the tank gains in importance. Dispersion and rapid concentration, often on a distant objective, to make the most of the mobility of the tank will call for training and staff work of the highest calibre. The size and nature of the administrative echelons of the armoured division will need drastic overhauling. Perhaps helicopters will help to provide the answer.

(7) CONCLUSION

To sum up briefly, it would appear to me that:

(*a*) Any future war in which the tank in all its roles is likely to be effectively tested will almost inevitably include the U.S.S.R. and/or the U.S.A. and such combination of countries as may be drawn in on either side. It will then be a global total war which will most probably include the use of atomic weapons.

(*b*) Post-war developments generally, including atomic weapons, have not lessened the importance of the tank. Indeed, the threat of atomic attack may well give to the armoured formation increased opportunities both in attack and defence. The mobility of the armoured formation gives it great flexibility so far as controlled dispersion and subsequent concentration is concerned. The problem posed will, however, need a very high degree of staff work and training and close cooperation between all arms, including the air. All unnecessary vehicles must be eliminated and the possibilities of supply by helicopter fully examined.

(*c*) Anti-tank weapons have improved and are likely to continue to get more deadly, but it may be possible in the near future to build a lighter tank with equally powerful protection and armament and to provide new means of crossing obstacles.

(*d*) There should be a standard medium/heavy tank for the dual purpose of supporting the attack of infantry on heavily defended areas and also forming the main equipment of the armoured division for mobile operations. The Centurion fulfils this role fairly satisfactorily. Its recently announced successor should mark an improvement both so far as performance and thickness of armour are concerned.

(*e*) There is a present requirement for a heavier tank, mounting the most powerful gun possible, to support both set-piece and mobile operations and to act as a main pivot for the defence. These will support and NOT replace the Centurion. There is no requirement for a light fighting tank, though the addition of a tracked reconnaissance vehicle is probably necessary.

(*f*) The success of all operations where tanks are used will depend largely on close cooperation between tanks, infantry, artillery, and the other supporting arms, including the air. The tank has many tricks up its sleeve for dealing with anti-tank weapons and other tanks. Smoke and night operations may play an increasingly important part, particularly in open country. Development of infra-red and other methods of defeating tank movement under cover of darkness must be expected.

Finally, may I again say that above all it is the morale and training of the tank crew that count most, whatever the type of operation.

L. O. LYNE

CHAPTER XXVIII

PRINCIPAL INTERNATIONAL MARITIME EXERCISES IN 1953

By Rear-Admiral H. E. HORAN

THERE WERE two important Maritime Exercises in 1953 in which the sea and maritime air forces of the North Atlantic Powers took part, one in the North Atlantic (Mariner), the other in the Eastern Mediterranean (Weldfast). Both had the same object: to exercise the N.A.T.O. forces in co-ordinated operations and this involved testing the command structure very thoroughly in both areas. No strategic setting was used in either exercise; both were "set-pieces." The underlying idea was to give experience to the officers and men of the forces engaged in the roles they would be called upon to perform in war and, from careful analysis, to build up a common tactical doctrine.

EXERCISE MARINER

Exercise Mariner began on September 16, 1953 and lasted 19 days. It was under the general direction of the Supreme Allied Commander, Atlantic, Admiral L. D. McCormick, U.S.N. (SACLANT), the Supreme Allied Commander, Europe, General A. M. Gruenther, U.S.A. (SACEUR), the Allied Commander-in-Chief, Channel, Admiral Sir John Edelsten (CINCHAN) and the Allied Maritime Air Commander-in-Chief, Air Marshal Sir Alick Stevens (CINCMAIRCHAN).

Some 300 ships and 1,000 aircraft took part in this exercise and about 500,000 officers and men, mostly sea and air, from the N.A.T.O. powers were directly employed. The area chosen for the operations extended from the Arctic Circle to the south of Gibraltar and thus embraced what would be in war the most important sea lanes along which the re-inforcements and supplies for the N.A.T.O. forces on the continent of Europe would have to pass.

One of the main purposes of the exercise was to practise the Naval Control of shipping in war. This control includes the organisation for the assembly, sailing and routeing of convoys, and independently routed merchant ships, the training of convoy escort forces against submarine and air attack and the practising of operating and tactical procedures against these threats.

In consequence of this a number of convoys, both ocean and coastal, were sailed through the Atlantic, the Channel and the North Sea. They mostly consisted of naval vessels and fleet auxiliaries and they had escorts, both anti-submarine and anti-aircraft, drawn from the sea and air forces of the nine nations taking part in the exercise. In addition a number of large fast merchant ships, with the consent of their owners, took part as independently routed ships not proceeding in convoy.

In the protection of shipping emphasis was placed on the wide-spread use of shore-based anti-submarine and carrier-borne patrol and attack aircraft for searching out and "destroying" enemy submarines and surface raiders and, in co-operation with surface forces, the latest developments in anti-submarine warfare were tested. In this respect it is interesting to note that a squadron of Shackletons of Coastal Command operated from the United States in exchange for a U.S. patrol squadron based in the United Kingdom. A Royal Canadian Air Force squadron transferred to a base in the U.K. as the scene of operations moved eastwards, and a squadron of Coastal Command was based near Lisbon.

NARRATIVE

The exercise began when the sea forces of the United States and Canada sailed from their east coast ports and carried out various tactical and pre-arranged training manœuvres in the north-west Atlantic as they made their way to join up with forces from the United Kingdom and other European N.A.T.O. nations. At approximately the same time, ocean convoys left the United States direct for Gibraltar and the Mediterranean. All the forces carried out "war routine"—ships' companies in war watches and ships darkened at night—from the start of the exercise, and each force or convoy was swept out of the ports of departure by squadrons of minesweepers while air patrols against submarines were flown both from the land bases and the aircraft carriers.

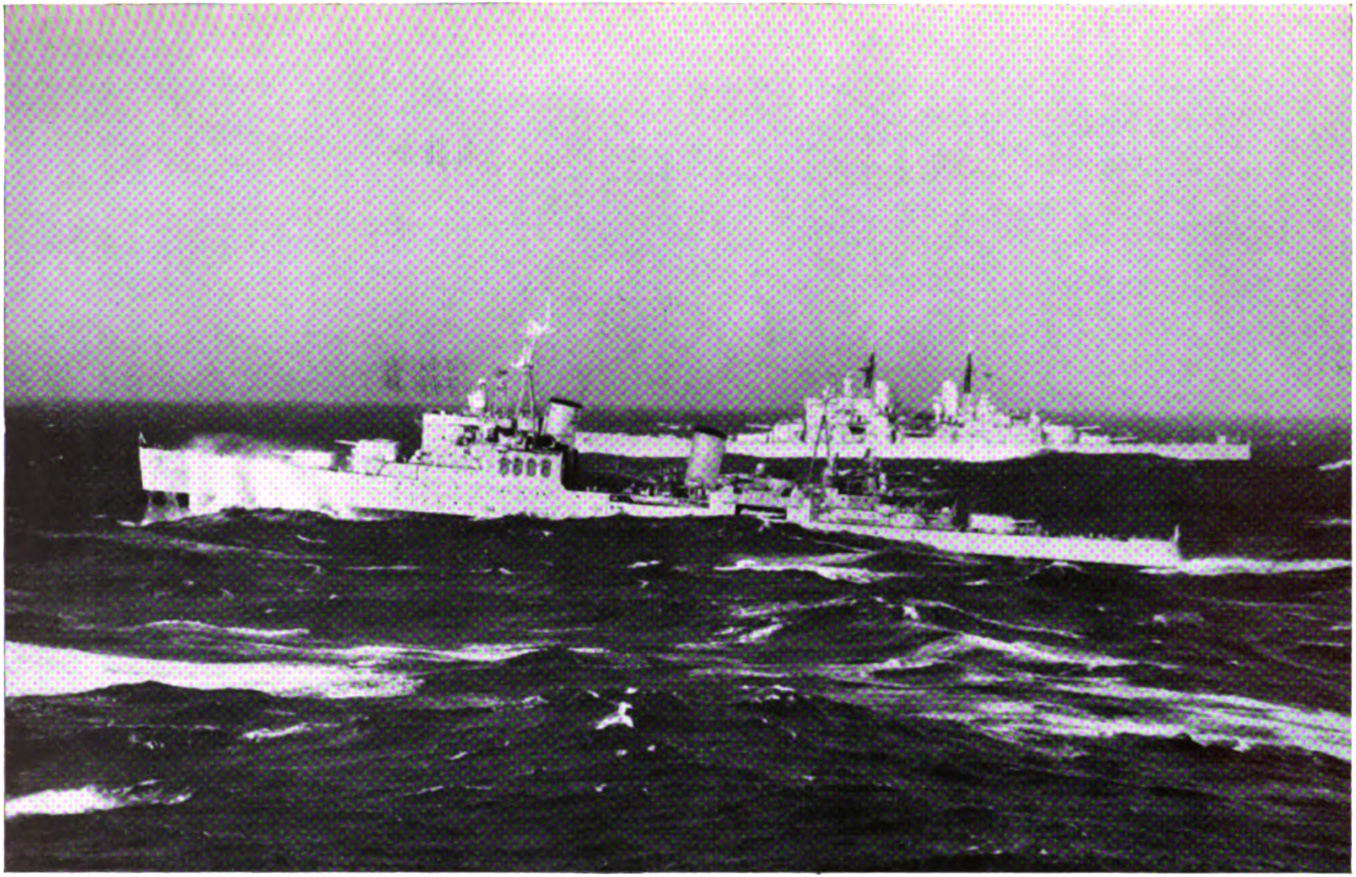
Contacts were made shortly after the forces sailed with submarines acting as "enemy" and these were continuous as the sea forces moved towards the south coast of Greenland.

As these forces approached western European waters ships of the British Home Fleet, sailed from ports on the east coast of Scotland to join up. These were under the control of Admiral Sir George Creasy acting in his N.A.T.O. capacity as Commander-in-Chief, Eastern Atlantic and exercising his command of operations within this area from shore-based headquarters at Northwood, Middlesex. Simultaneously operations in the Channel, North Sea and around the British Isles began. These included the sailing of an important convoy from Loch Ewe (west coast of Scotland) to Bergen in Norway.

These latter operations were on a scale larger than any post-war exercise in Home Waters and were controlled by Admiral Sir John Edelsten in his N.A.T.O. capacity as Commander-in-Chief, Channel, from his headquarters at Fort Southwick near Portsmouth. These headquarters were manned on a war footing with a N.A.T.O. staff which included regular officers of the participating nations and some reserves recalled for the period of the exercise only.

As the heavy forces made their way towards the Denmark Strait (between Greenland and Iceland) the weather—an important item in all operations at sea—played its usual part. Gales of up to 60 knots with heavy seas and short visibility were the order of the day. It is on record that some big ships rolled up to 26 degrees and of course the smaller types were much hampered in their operations. Owing to the flying restrictions necessary in peace-time operations, designed for the safety of the aircraft and their crews, flying had sometimes to be cancelled and thus the sea forces had to rely on their own resources for reconnaissance etc.

It was in these conditions that an "enemy raider" was reported as attempting to break out into the Atlantic from the eastward through the



(*Official Admiralty Photograph*)

N.A.T.O. Exercises in Atlantic. H.M.S. Vanguard, battleship, and H.M.S. Sheffield, cruiser, in heavy weather

Denmark Strait. Though the weather—usual in this part of the world—was vile, with high winds, heavy seas and short visibility, she was intercepted and put out of action.

Also it was in this kind of weather that it became necessary to replenish the stocks of fuel and stores in the ships taking part. This was achieved from the Logistic Support Force which by this time were now in company. This force, consisting of tankers, supply and ammunition ships, is nowadays an essential part of any sea-going fleet. That the replenishment operations were carried out in the prevailing weather without accident speaks well for the seamanship displayed by all concerned.

The scene of operations for the heavy forces now shifted southward to the area off the west coast of Ireland. This was the chance for "enemy" aircraft to concentrate their efforts on the sea forces. By this time the weather had improved considerably and several interesting operations were possible; but even in these better conditions the "attacking" aircraft were hampered.

"Enemy" air raids on ports and shipping in the U.K. and on the Continent and heavy minelaying in estuaries and port approaches now developed. The ports of Dover, Portsmouth, Harwich, Le Havre, Rotterdam, and the Scheldt estuary as well as the convoys in the waters round the British Isles, were all attacked. A particular target was the Thames estuary but short visibility greatly hampered the "enemy" here. In a report on the exercise the remark is made that on September 25 "shipping in the Thames Estuary was hampered as much by fog as by enemy activity." It was during this period that the important convoy which had sailed from Loch Ewe reached its destination (Bergen) after coming under attack by both "enemy" submarines and aircraft. The value of having an aircraft carrier—H.M.S. "Illustrious"—in company with this convoy was clearly demonstrated during this voyage. The convoy was under constant menace from "enemy" submarines and aircraft and there were also reports that surface raiders might be operating along the route. In circumstances such as these carrier-borne aircraft are essential in sufficient numbers as they can "locate and report; attack and destroy" any type of enemy that happened to be in the vicinity of the convoy on passage; for it is vain to hope that shore-based aircraft will be available when and where required. A classic example of this state of affairs was in the Second World War when the "Prince of Wales" and "Repulse" were sunk off the east coast of Malaya by Japanese aircraft. This attack was only made possible because shore-based fighters were not available on the spot as had been hoped and expected by the Admiral in command. Had immediate carrier-borne fighter protection been available the war in the Far East, hinged as it was on the loss of Singapore, might have taken a very different course.

The calm and foggy weather that prevailed about this time (September 25 and 26) in the North Sea and Channel favoured operations by light "enemy" forces—fast patrol boats. Further, a surface raider was reported in the vicinity of the Firth of Forth which retired into the North Sea after a short engagement with defending surface and air forces. The heaviest "enemy" submarine activity was concentrated in the south-western approaches to the British Isles where they made many attacks on convoys and independently-routed merchant ships. The approaches to the Bristol Channel and Plymouth seem to have been specially chosen by the enemy not only for submarine attacks but also for mining activity. But it is worth while to note that the defending aircraft were very active and claimed several successes not only against the marauding submarines but also the minelaying aircraft.

Although not actually part of the exercise, an attack by parachute troops took place on the R.A.F. station at Topcliffe, Norfolk, but thanks to alert intelligence the station personnel were able to take defensive action and the attack came to nothing.

On October 1 the exercise had reached its most intense phase and the opportunity was taken by the members of the North Atlantic Council, who work in Paris, to visit the various commands in the U.K. "Enemy" submarine and air activity had by now extended to the Bay of Biscay and the approaches to the Strait of Gibraltar. This was to a large extent countered by the N.A.T.O. aircraft based in Portugal and French Morocco and the surface escorts with the convoys. But it is a clear illustration that, as attacks on shipping will not only be confined to the waters round the British Isles, steps must be taken to make the necessary defending forces available to counter them in waters much further afield.

On October 2 the British contingent of heavy ships which had up till then been attached to the striking fleet under Vice-Admiral J. S. Combs, U.S.N., were detached to the Clyde where they took part in an exercise to test the defences in that locality.

The closing stages of the exercise showed a marked increase in "enemy" sea and air activity—a final spurt in fact. In the Atlantic north of Madeira, French and British aircraft made successful attacks on "hostile" submarines. The English Channel proved a happy hunting ground for both sides while the presence of the Striking Fleet off the south-west coast of Ireland also proved a lure to "enemy" submarines and aircraft. While protection was given to shipping menaced by aircraft and submarines a combined air/sea battle broke out in the North Sea with "enemy" surface forces. Two forces of "E" boats were engaged by aircraft and foiled in their attacks on the convoys in that locality. More dramatic still was the hunting down of an "enemy" destroyer first detected by aircraft. The Netherlands destroyer "Evertsen" was "homed" on the "enemy" and, in conjunction with the aircraft, "destroyed" her.

The exercise ended on October 4.

REMARKS

Exercise Mariner was by far the largest sea and maritime-air exercise ever carried out. Forces were provided by Canada, Denmark, Belgium, the Netherlands, France, Norway, Portugal, the United Kingdom and the United States. Thus there were representatives of all the N.A.T.O. powers, with naval and air forces, whose shores are washed by the Atlantic and the North Sea.

Five years ago if anyone had said that these large forces of so many nations could operate together and act in concert he would have been laughed to scorn. Now what appeared impossible has come to pass and every report that is available speaks of the cohesion and co-operation of all forces. Mistakes were of course made in details but generally speaking these did not in any way affect the conduct of the operations.

All forms of communication stood up to the strain of extended periods satisfactorily, thus orders for the conduct of all forces engaged were quickly and accurately obeyed. What appeared most gratifying was the understanding and mutual support that existed between the sea and maritime air forces of all the powers taking part. Team work was excellent, as is evidenced by the continual reports of aircraft "homing" surface ships on to various types of "enemy."

A most satisfactory feature of the whole exercise was the standard of seamanship and airmanship displayed by the officers and men of all the nations taking part. This seems to show that these arts are not confined to any one nation but are a universal production of experience. As more experience is gained so the standard will naturally improve.

Round the coasts of the British Isles and in the approaches to the European ports minelaying operations were carried out by the "enemy" on a large scale. That ports had to be closed while the channels to them were cleared only goes to show that the minesweeping resources fall short of what are required.

It is not known if the number of escorts for the forces and convoys which operated during this exercise were considered sufficient. But, even if they were for these duties, it is only right to imagine that in the event of another global war they would be on the short side. This is how all naval wars have started in the past and it is during the period of this scarcity that the losses among merchant ships are heaviest. If the forecast of the warfare to be expected in the future given in the White Paper on Defence (*see* p. 373) is correct, it seems very unlikely that there will be time to build up the necessary strength before a decision is reached.

Finally in all operations at sea the weather factor must be given full consideration. Aircraft and small ships are at a great disadvantage in stormy seas and so it becomes necessary that large ships, that can keep the seas in any weather, shall form part of any fleet. Mist, fog and short visibility can to a large extent be overcome nowadays by the use of electronic devices but nothing but size and tonnage give the ability to operate continuously in the 30 foot seas that are liable to get up in gales in all the oceans of the world.

EXERCISE WELDFAST

Exercise Weldfast was the more important of the two exercises held in the Mediterranean during 1953. It was the largest to be conducted up-to-date and was the first to involve both the Southern Europe and Mediterranean Commands. Admiral W. M. Fechteler, U.S.N., Commander-in-Chief, Allied Forces, Southern Europe and Admiral the Earl Mountbatten of Burma, Commander-in-Chief, Allied Forces, Mediterranean, acted as Joint Exercise Co-ordinators throughout the exercise which took place between September 30 and October 8. It therefore overlapped Exercise Mariner to a certain extent.

The setting of the exercise in the South European area of responsibility involved the defence of Thrace by the Greek and Turkish armies, supported by aircraft from the Naval Striking Force and Allied Air Forces, Southern Europe against an attack from the north. There was also a "drop" by Italian parachute forces in Sicily. Although there were no strategical implications in the exercise, the naval operations of the forces of the

Mediterranean Command were designed to fit into this setting and took the form of those operations which might be necessary to keep open the sea communications through the Aegean.

The forces under the direction of Admiral Mountbatten during the exercise comprised ships and aircraft of the Greek, Turkish, Italian, United States and United Kingdom navies, the Royal Air Force and the United States Naval Air Force. Immediate operational control of the Allied Naval forces was delegated to the Area Commanders in accordance with the command structure set up by Admiral Mountbatten. In this exercise these were Vice-Admiral Lappas, Royal Hellenic Navy, with his headquarters in Athens and Admiral Altincan, Turkish Navy, with headquarters in Ankara. These two commanders also exercised control over certain of their national forces employed on national tasks. It is a principle of the Allied Forces Mediterranean Command organisation that the allied area commander should also be the national Commander-in-Chief. Control of maritime aircraft of the United States Navy and Royal Air Force was delegated to Rear-Admiral Cruise, U.S.N., who set up a temporary headquarters in Athens alongside that of Vice-Admiral Lappas. All submarines were "enemy" throughout the exercise and, together with the aircraft operating in the pro-submarine role, were controlled by Commander Submarines, Mediterranean from Malta.

NARRATIVE

When the exercise started a convoy of Greek landing ships under escort of Greek light forces and H.M.S. "Gambia" sailed from the Pireaus (near Athens) towards Smyrna in Asia Minor and was then diverted south towards Crete where they joined up with the Amphibious Attack Group of the Naval Striking Force, Southern Europe for a landing rehearsal near Kanea on October 2. A convoy of Royal Naval Landing Craft from Malta, escorted by frigates of the Royal Navy entered the Aegean through the Kithera Channel and was routed along the north coast of Crete to make the same rendezvous. A further convoy, under Turkish destroyer escort, also sailed from Smyrna to Crete.

Minesweeping operations were given prominence as is shown by the following list of sweeps that were carried out. A United States minesweeping group swept a channel northwards through the Aegean and then established channels in the northern part of that sea. A squadron from the Royal Navy established a swept channel east of Suda Bay (Crete) while a Greek squadron, under national control, cleared and maintained a channel into the Pireaus and later moved into the Salonika/Kavalla area.

A mixed Greek/British force of destroyers and frigates carried out offensive anti-submarine patrol operations in the central Aegean and then established barrier patrols in the Kaso Strait.

Throughout the exercise H.M.S. "Theseus," with a strong escort of British destroyers, was operating in the southern Aegean flying anti-submarine patrols and providing fighter protection for all forces south of the 38th parallel. This was the only form of air protection available owing to the lack of shore-based aircraft. On the two occasions when she withdrew for replenishment her escort carried out offensive anti-submarine sweeps north of Crete.

One of the new fast anti-submarine frigates from the Royal Navy, simulating a fast enemy minelayer, attempted to lay "mines" off the entrance to the Dardanelles but she was intercepted and attacked by a force of Turkish destroyers operating under national control.

MARITIME AIR OPERATIONS

United States naval patrol aircraft operated from Timbakion in Crete with logistic support provided by two Landing Ships (Tank), also Royal Air Force aircraft flew from North Africa and Malta. Throughout the exercise sorties were flown in support of the convoys and also in support of the Striking Force during its passage through the Mediterranean. At the beginning of the exercise United States aircraft acting as "enemy" flew a minelaying mission to the Northern Aegean.

AMPHIBIOUS OPERATIONS

Amphibious Operations formed an important part of the exercise. After the rendezvous between the Greek and British landing craft convoys and the Amphibious Attack Group of the Naval Striking Force, Southern Europe on October 2, a rehearsal for a landing was arranged to take place on the beaches in the vicinity of Kanea (Crete) under the command of Rear-Admiral Wilkin, U.S.N., flying his flag in the headquarters ship U.S.S. "Taconic." Weather interfered considerably with the landing although the planned air strikes from the fast carrier group were flown and the landing craft were lowered and filled. The whole force was then sailed in three groups through the Aegean to Kavalla where the main amphibious assault, designed to relieve pressure on the Greek and Turkish armies, took place in perfect weather on October 6.

After the landing all groups were reformed and made their way southwards until the exercise terminated on October 8.

REMARKS

The exercise setting provided the maximum value in inter-allied and specialised training for submarines in attack, and surface and air escorts in detection and counter attack. This must clearly be an object in any such exercise, even at some expense to realism. The exercise, however, also provided a test of the abilities of commanders of the many nations involved to plan and execute joint exercises on this scale. It proved the fundamental soundness of the command arrangements on Europe's southern Mediterranean flank, and demonstrated that real team work can be, and is being, carried out between the two major commands in this area.

No detailed mention has been made of the activities of fast aircraft carrier groups of the Naval Striking Force, Southern Europe. This force operated throughout under Admiral Fechteler's control and provided the vital air support to an amphibious landing and subsequent support to the land battle which it is this force's duty to supply. Such operations are the modern form of the traditional role which sea power has always afforded—the ability to deploy, with maximum flexibility, naval striking power for army support. To carry out this role, control of the sea communications and local control, at least, of the air over the area of operations is vital. There is as yet no indication that such control can be achieved without a balanced naval force supported by both shore-based and carrier-borne aircraft.

CONCLUSION

The general impressions that remain in the mind after a study of both these exercises are:

(*a*) The co-ordination and co-operation achieved among the sea and maritime air forces of the N.A.T.O. powers has reached a high degree of efficiency. It is true of course that mistakes were made but they provided valuable lessons and it is only right to assume that these will not be forgotten.

(*b*) Nothing can overcome the uncertainty of the weather factor in all operations on the sea. The conditions met with in the North Atlantic at an important moment, when a surface raider was making a break-out, and also in the Mediterranean when a landing rehearsal was due to take place at Kanea, shows conclusively the uncertainties which can arise.

(*c*) The importance of having strong carrier-borne air support, not only on the trade routes but also in all amphibious operations was very clearly emphasised. Without this the sea forces cannot carry out their role of constant and effective controlling the sea communications and giving close sea and air support to the convoys and amphibious forces when and where required. After all, aircraft carriers are fully-equipped, highly mobile airfields and, in this age when air power counts for so much, it is only commonsense that provision should be made for them in the general overall strategy of the N.A.T.O. powers.

H. E. Horan

CHAPTER XXIX

NIGHT FIGHTING IN LAND WARFARE

By Major H. B. C. Watkins

INTRODUCTION

So many of the British Army's most notable victories have been won under conditions of marked numerical inferiority that there is, perhaps, some danger of our developing too complacent an attitude to the factor of "Relative Strengths" when considering the military problems which now confront us.

The strength of our potential enemy is no secret. Not only can he put some hundreds of well equipped divisions into the field, but the strength of his front line aircraft for the support of those divisions is most formidable. We must therefore train to defend ourselves against a foe who will not only greatly outnumber us on the ground, but who will, initially, be in a position to achieve a marked degree of air superiority over the battle area. Thus our principle problems are to find a means of counteracting the enemy's numerical advantage and to develop a tactical doctrine which will enable our own troops to operate with as little interference as possible from the enemy's air force. The aim of this article is to discuss the value of night fighting in the solution of those two problems.

PAST EXPERIENCE

Before looking to the future it is worth considering how we can benefit from the experience of the past. Over a hundred years ago Clausewitz wrote: "Surprise is more or less at the foundation of all (military) undertakings, for without it superiority at the decisive point is really not conceivable. Surprise becomes therefore, the means to the attainment of numerical superiority but it is also to be regarded as an independent principle in itself, on account of its moral effect. When it is successful to a high degree, confusion and broken courage in the enemy's ranks are the consequences."* "Fundamentally, every night attack is only a more intense form of surprise."†

The truth of these two statements is timeless and has been proved repeatedly in recent years.

There are many instances of success in battle having been achieved through the skilful use of darkness to cover the redeployment and assembly of troops prior to an assault at first light—Wolfe's army scaling the Heights of Abraham at Quebec; the move of Allenby's Cavalry Corps before the Third Battle of Gaza; the assembly of the tanks before the Second Battle of Amiens, at once come to mind—but properly co-ordinated large scale assaults launched during the hours of darkness have been few. However such experience of this type of operation as we have had has demonstrated its immense possibilities.

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* Clausewitz, *On War*, p. 142. (Pub. The Modern Library, New York, 1943.)
† *Ibid.*, p. 224.

(a) *Discussion between the Wars*

In the early nineteen twenties a high level committee sat in the War Office to consider the lessons of the 1914–18 War. Their findings included a recommendation that far more importance should be paid to the technique of night fighting, since they considered that victory in modern war without tactical surprise was virtually impossible and that redeployment by night would often be the only means of achieving such surprise. Furthermore, they considered that a night attack would frequently be the most economical way of exploiting such surprise. These findings represented a great step forward in tactical thought but, unfortunately, they were not received with any marked enthusiasm by the Army as a whole. Nevertheless three officers, who were later to achieve world wide fame, were great protagonists of night fighting and pursued the new doctrine vigorously. These three were Field Marshal Alexander, Field Marshal Wavell, and General Pile. The last named was then commanding the Canal Brigade in Egypt and in 1934 gave night operations absolute priority in his training programme. It is of interest that Field Marshal Montgomery, who opened his greatest victory with a night attack, was a battalion commander in the Canal Brigade under General Pile.

Captain Liddell Hart, who was consulted by the War Office committee when they started their deliberations, wrote a paper for them in which he laid special stress upon the night attack and upon the conversion of the "break-in" attack to the "break-through." This conversion was to be achieved by an accelerated technique of exploitation employing a completely mechanised force, supported by assault aircraft and applying quickened means of communication, further development of wireless, more forward command and less elaborate orders. His paper was put forward at a time when the use of armoured troops in any role, other than the basic function of infantry cooperation, was anathema to many and the tactical support role for aircraft was almost unknown. Military wireless too was in its infancy and the whole organisation of command was clumsy and over elaborate. When considering how the night attack developed during the Second World War it is interesting to note how sound Liddell Hart's early study was to prove.

(b) *The Attack*

Night is the natural element of the small raiding force, but the many daring and highly successful operations carried out by airborne and commando type troops during the late war do not fall within the scope of this article. Our concern lies chiefly with the conduct of night operations by a conventional force of all arms.

As late as 1941 it was still generally considered to be impracticable to operate with armour at night. There were however a few bold and imaginative spirits who were convinced that, under certain circumstances, tanks not only could but should be used in night attacks and that the cost of such operations would be immeasurably less than that of the conventional daylight assault. Their faith was put to the test, and proved, in November, 1941, when a battalion of New Zealand infantry, led by two squadrons of infantry tanks, cut through the Bel Hamed position by night to relieve Tobruk, joining hands with the Garrison at El Duda, almost without loss. The operation involved the penetration of no less than 3½ miles of heavy enemy defences, against which considerable casualties had already been suffered in a daylight attempt. This success was quickly followed by another on a larger scale when 1st Army Tank Brigade, supported by two brigades of the 2nd South African Division, broke into and captured the immensely strong Axis position at Bardia.

The Bardia battle was a perfect example in miniature of what can be achieved at night by well-trained, high quality troops against a strong defensive position. The small scale but spectacular success at Él Duda had convinced General Norrie (then commanding XXX Corps, of which 1st Army Tank Brigade formed a part) of the possibilities inherent in the use of infantry tanks at night. In addition it had given a tremendous fillip to the tank crews who had reached a high standard of training in night fighting after much hard work. There was never any doubt in their minds that they would succeed in this new task. Thus they went into the attack armed with two great assets—a high state of training and complete confidence. These two factors are absolute pre-requisites in night fighting of any type.

The attack was planned in two phases and launched from a flank. The first phase was a "break-in" by an armoured regiment and two battalions of infantry with strong engineer support. Its aim was to clear a way through the minefields and defences so that the second phase—the "break-through" by two armoured regiments and four battalions of infantry—could be launched at first light. Phase I was a complete success but a sharp counter attack by the enemy overran the lefthand battalion and made the commencement of Phase II at first light impossible. Faced with the alternatives of a daylight attack or a postponement until the following night, the tank brigade commander decided upon the latter course. This went entirely to plan and resulted in the capture of many thousands of prisoners and great quantities of equipment. For an engagement of this size the casualties suffered by both tanks and infantry were almost negligible.

The operation, which has been described only in the barest outline, was of great interest, for it marked the beginning of a new era in tank warfare and entirely confounded the diehards, who had for so long opposed the use of the tank in a deliberate assault at night.

Success was due chiefly to the high state of morale and training of the tank crews taking part. The moral ascendency gained over the enemy whilst the attack was in progress was absolute. Nevertheless an important lesson is to be drawn from the speed and effectiveness of the enemy's local counter attack at the end of Phase I which had so marked an effect upon the progress of the operation. To have launched that counter attack at that time, after a night of absolute bedlam, was a clear demonstration of what can be achieved in the most desperate straits by well trained troops. Had the enemy been able to follow up his success the whole story might well have ended differently.

Other important lessons on night fighting to be drawn from the capture of Bardia were:

(*a*) A determined and well trained force of all arms can assault and seize by night a strong defensive position against which a daylight attack by a far stronger force would be impossible without very heavy loss.

(*b*) Night attacks save lives and equipment.

(*c*) The effect of surprise upon the enemy's morale will frequently be the deciding factor in the battle.

(*d*) It is of primary importance to maintain the momentum of the attack.

(*e*) The plan must be simple and must be thoroughly understood by every soldier taking part.

(*f*) Communications are vital. (For this reason control may often best be vested in the armoured commander in attacks involving the use of large numbers of tanks.)

(*g*) Whilst the maintenance of direction will always be difficult, this difficulty can be greatly reduced by the imaginative use of material already available within divisional resources, e.g., marker shells, taping of routes for follow up elements, controlled use of artillery fire, etc.

(*h*) A well trained enemy will re-group quickly after being dislodged and will counter attack before consolidation is completed.

Subsequent operations during 1942 brought with them a further important lesson:

Where adequate forces are available to provide a reserve element for exploitation, the degree of success achieved will be increased out of all proportion to the additional effort required.

The capture of Bardia had done much to prove the truth of Clausewitz's teaching on the Night Attack and its lessons were fundamental to future tank/infantry cooperation at night. From the very nature of that particular operation, however, those lessons were by no means complete and could only be regarded as pointers to the inherent possibilities of the night attack under less limiting circumstances.

These possibilities were fully demonstrated in Normandy on the night of August 7/8, 1944, by the 2nd Canadian Corps in an operation known as "Totalize."

This operation, which took place twenty-six years to the day after the Second Battle of Amiens, was designed to clear the main Caen–Falaise road with a view to cutting off the bulk of the German troops west of the River Orne.

The Corps Commander, Lt.-General Simonds, had at his disposal three infantry divisions, two armoured divisions and two independent armoured brigades, together with a quantity of specialised armour from 79 Armoured Division.

He was opposed by two battered but well tried SS Panzer Divisions and one raw Wehrmacht infantry division. These formations were deployed in depth across the plain south of Caen holding a series of mutually supporting strong points. Not less than 60 dug in armoured vehicles and 90 88-mm. guns were covering the front, all in ideal positions with wide arcs of fire. The ground sloped steadily from North to South thus giving excellent observation and making a daylight attack extremely hazardous.

In his appreciation General Simonds pointed out that the recent activity of the Canadians in the area had made their intentions plain to the enemy and that tactical surprise in respect of direction or objectives was therefore impossible. Surprise in respect of time and method was, however, still possible but very heavy fighting was to be expected.

A bold and imaginative commander, he decided to attack by night, spearheading his advance with a fully armoured force consisting of the two independent armoured brigades and a strong infantry component, from 51st (Highland) and 2nd Canadian Infantry Divisions, carried in armoured vehicles.*

With this force, split up into eight columns, supported by specialised armour, he determined to burst through the forward defences and anti-tank screen, by-passing the strong points. His infantry would be delivered fresh and ready to fight straight on the first objective, just short of the main German defensive position. Meanwhile the remaining infantry of the two divisions named, supported by Crocodile flame-throwing tanks, would follow-up on foot, clearing up the strong points as they advanced.

The second phase of the operation was to be an attack by the two armoured divisions against the main position itself at 1400 hours on the following day. This attack was to be exploited in the third phase as ordered by the Corps Commander.

The plans for the support of the night attack were very elaborate and somewhat unorthodox. As at Amiens in 1918, it was decided to launch the attack without any form of preliminary bombardment, apart from normal counter battery shooting, thus gaining the maximum surprise possible with regard to timing.

At H-hour, some 650 bombers were to drop no less than 3,000 tons of bombs on the villages flanking the axis of the advance. Fifteen minutes later the first troops were to cross the start line behind a barrage 4,000 yards wide by 6,000 yards deep which was to move in 200-yard lifts at a rate of 100 yards a minute. By this means General Simonds hoped so to demoralise the enemy that the armoured columns, who in their turn would help to spread terror and confusion, would have a pretty clear run to the de-bussing areas and arrive there without undue delay.

Considerable thought was given to the problem of maintaining direction. Artificial moonlight, Bofors guns firing tracer along the flanks of the advance, marker shells on the inter-divisional boundary and route-marking by engineers with tapes and lights were all arranged. In addition, compasses were mounted on special navigating tanks which were surveyed in on their thrust lines. It was realised that even with all these aids there was still a very real risk of direction being lost, but it was felt that the odds had at any rate been shortened to reasonable proportions.

Although it had been hoped that a full week would be available for rehearsal and preparation, this period was finally reduced to a mere 48 hours. In modern warfare this is about as long as any commander can reasonably expect for this purpose and, in the event, the troops were launched into battle as fully briefed and as well rehearsed as would normally be possible under similar circumstances. The fire plan started punctually and the armoured columns crossed the start line without delay. Within minutes, however, it became apparent that dustclouds, raised by the barrage, the flail tanks and the tracks of the armoured vehicles, were rendering the artificial moonlight quite useless. The enemy were quick to take advantage of this and cleverly laid smoke to increase the confusion.

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* Some 60 Priest SP 105 mm. guns were disarmed and converted in the field for use as Armoured Personnel Carriers (APC's). In addition a number of half-tracks and scout-cars were to be employed for the same purpose.

Fortunately the real moon rose at H plus 60 minutes and considerably improved the visibility.

On the left the Scottish columns pushed ahead and reached their debussing areas without much trouble. On the right, however, the Canadians were seriously delayed by cratering from the bombing and lost direction badly about half way to their objective. They finally debussed more than an hour after the barrage had ceased, fortunately without further serious incident, though this lack of fire support might well have had dire results.

The bombing and the barrage had not had the stunning effect upon the enemy in the strong points upon which the Corps Commander had counted. Although some of the untried troops ran in terror, the bulk of the SS troops hung on grimly, inspired by the personal example of Major-General Kurt Meyer, G.O.C. 12 SS Panzer Division, who drove many stragglers back to their positions. As a result the follow-up force had a very stiff fight and suffered a number of casualties before they eventually cleared the last pocket of enemy at 1530 hours the next afternoon. The night attack had been a great success but the planned delay in launching Phase II gave the enemy just the respite he required. As a result little further progress was made towards Falaise.

It is easy to be wise after the event but had Phase II been launched at first light on August 8, regardless of the confusion still reigning in the areas being mopped up by the infantry, it seems more than likely that a complete breakthrough would have been achieved and the fate of the greater part of von Kluge's forces sealed. Nevertheless the operation proved that an attack on this scale could be carried out at night without serious loss and that it was an effective means of counteracting the tactical advantage held by an enemy in a good defensive position, well covered by anti-tank weapons.

The following lessons from "Totalize" added to those already learned in other theatres:

(*a*) The value of APC's in a night advance.
(*b*) The importance of having a flexible fire plan.
(*c*) A determined enemy will recover quickly from the stunning effect of aerial bombardment. (The far reaching effect of Meyer's personal example in this connection is also noteworthy.)
(*d*) The need to avoid cratering on the axis of advance if heavy bombers are employed in support of a night operation.
(*e*) That in an operation on this scale confusion is inevitable but that the casualties so caused will be far less than those which would have been inflicted by the enemy in daylight.

So much, then, for the carefully planned, deliberate type of night attack. There is, however, immense scope for the use of armoured formations in "opportunity" attacks, mounted by verbal orders over the wireless and launched with the minimum of delay to capitalise some fleeting tactical chance.

The devastating effect which such an attack can have upon a strong enemy, partly off balance, is graphically described by Alan Morehead in his book *The End of Africa*.

Towards the end of the Tunisian Campaign large enemy forces were withdrawing to an immensely strong defensive position across the Cape Bon peninsula.

Realising the supreme importance of forestalling the enemy's efforts to establish himself in this fortress, Field Marshal Alexander ordered 6th Armoured Division to cut across the neck of the peninsula on the night of April 8, 1943.

So shattering was the effect of this attack, that within four days over a quarter of a million Germans and Italians had laid down their arms.

The following lines from Morehead's description of the action show how surprise was "successful to a high degree" with "confusion and broken courage in the enemy's ranks as the consequence": "They broke clean through to Hammamet inside the next ten hours. They roared past German airfields, workshops, petrol, and ammunition dumps and other positions. They did not stop to take prisoners—things had gone far beyond that. If a Comet had rushed down that road it could hardly have made a greater impression. The Germans were now entirely dazed. Wherever they looked British tanks seemed to be hustling past. . . . The German generals gave up giving orders since they were completely out of touch. . . . In a contagion of doubt and fear the German army turned tail . . . the army became a rabble . . ."

Those who criticise the British Army for being too slow and too ponderous to exploit its opportunities would do well to consider the truth of their contention in the light of this model operation.

The necessity for first-class training, good communications and for the will to maintain the momentum of the attack were once again amply demonstrated.

The battles described have shown how, in the attack, the use of darkness can indeed become "the means to the attainment of numerical superiority." The broad principles governing the successful use of troops in these circumstances may be summarised as follows:

(*a*) Surprise.
(*b*) Simplicity.
(*c*) Training and preparation.
(*d*) Maintenance of momentum.
(*e*) Cooperation.
(*f*) Flexibility.

A plan in which these factors are given balanced consideration will have an excellent chance of success, the factor of "Relative Strengths" carrying far less weight than in a comparable operation in daylight.

(c) *Defence*

German experience in Russia and that of the Commonwealth Division in Korea, has proved that when defended localities are correctly sited in depth for all round defence, are mutually supporting, properly mined and wired, with an adequate measure of artillery support, there is little for first-class infantry to fear from massed night attacks by troops of lesser quality.

Our study of Operation Totalize showed how the tough SS elements of the defence held on to their positions, in spite of the battering they had received from the aerial bombardment and from the barrage and that they were not dislodged until late on the following afternoon. This delay, although tiresome, would not have prevented the immediate exploitation of the initial success, had this been planned. However, had the enemy been able to muster the necessary troops to launch a counter thrust at first light, as was done at Bardia, the whole operation might have foundered. Important though the counter attack force may be in a daylight defence, its importance is magnified many times at night. After a long night's fighting the attacking forces will inevitably be tired and in some confusion. A short sharp counter attack delivered at first light will not only be far more effective than a larger operation launched later in the day but may well disrupt the enemy's exploiting moves before they have got properly under way.

The intimate and effective support of the infantry position by all weapons is a fundamental requirement of the defensive battle, as also is the closest possible cooperation between artillery and the counter attacking force. The repeated failure of the Communists to penetrate the Commonwealth Division's positions in the face of accurate defensive fire from artillery, infantry, and tanks has proved this to be abundantly true.

The devastating effect of surprise upon the enemy's morale at Él Duda, Bardia, and Hammamet has already been discussed. We have seen too how in "Totalize," with the degree of surprise obtainable limited by the previous circumstances, it was not sufficient to throw the more seasoned troops off balance and that it was only the untried troops who ran. In Korea the enemy found it most difficult to achieve surprise against troops who repeatedly demonstrated that the answer to the night attack was to sit tight, fight back with every available weapon and counter attack at the earliest opportunity.

The climate in Korea accentuated one particular aspect of morale which is of special importance at night. The depressing effects of fatigue are greatly accentuated by exposure to severe climatic conditions. The importance of this problem was fortunately recognised early in the campaign and the provision of first-class protective clothing and the construction of proper bunker-type positions went far to counteract this menace.

One hears today on some sides the cry "Beware of the lessons of Korea," the inference being that the Korean campaign was fought under such unusual conditions that there is danger in applying its lessons too literally to other theatres of war. The successful conduct of defensive operations at night by the Commonwealth Division, however, proved conclusively that good training and high morale are an unshakeable combination.* This is, of course, only the reiteration of a military truism as old as time itself, but it is none the less valuable for that.

To sum up, the general principles governing the successful conduct of defence at night are:

(*a*) All round protection, with mutual support of defended localities.
(*b*) A high state of training and morale.
(*c*) Full coordination of the fire plan.
(*d*) Simple and effective measures for counter attack.

(d) *Summary*

The experience of generations has proved the value of night to cover redeployment or the assembly of troops before an attack.

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* In one of the several battles for the Hook position a single British battalion of 800 men repulsed an attack by no less than 15,000 Communists.

The Second World War showed how a night attack by a force of all arms could become a "means to the attainment of numerical superiority" but that the advantages to be derived from the night attack are largely conditional upon the gaining of surprise and upon the superior quality of the troops of the attacking force.

The war in Korea reinforced this qualification and, further, went on to show that where the defending troops were of the highest quality the situation might well be reversed and seemingly overwhelming night attacks repulsed.

The conclusion to be drawn, therefore, is that when planning night operations the relative quality of both sides becomes a dominating factor, second only to the attainment of surprise, but that when these factors are favourable to our own troops their employment by night is likely to reap greater rewards than under similar circumstances by day.

LOOKING FORWARD

(a) *The Air Problem*

Past experience having established the value of night fighting in helping to counteract any numerical advantage which the enemy may enjoy and, consequently, the desirability of developing a tactical doctrine embracing the use of the night attack, it is now possible to deal briefly with the associated problem of its value against an adverse air situation.

However efficient the radar equipment of modern ground support aircraft may be, it is patently impossible for pilots travelling at high speed to differentiate between friend and foe when ground troops are engaged in battle at night. Thus, at this time, the attacking troops have the advantage of having virtually eliminated the air threat and, if the reserves are well dispersed, of having greatly reduced the risk further to the rear. Those who remember the devastating effects of allied air supremacy in Normandy and the desperate plight of the Germans after several weeks of sustained air attack, will appreciate how immensely important it is, that on finding ourselves in an adverse air situation, we should be able to make the maximum use of the hours of darkness. The normal conditions of modern war have already made it normal procedure for redeployment and maintenance to be carried out at night. If this time is also to be used consistently for offensive operations it is clear that a very strict control over the activities of all troops at this time must be maintained and unnecessary movement ruthlessly eliminated. This must be so in the interests of efficiency and of morale—the best troops in the world cannot go indefinitely without sleep. One of the advantages of being able to fight efficiently at night is that when on the offensive it is possible for a Commander to maintain unrelenting pressure and really press home his attack. This is likely to pay tremendous dividends but brings with it difficult problems which must be overcome by experiment and training in peacetime.

The chief problem will be re-supply. Taking the worse case, it may well be that the air situation will make all forward movement of soft vehicles in daylight impossible. Under these circumstances the leading elements of a formation involved in a "round the clock" assault may find themselves cut off from their supply units and even from the reserve formations who are mopping up behind them. In order to carry on the fight in daylight these forward elements must have with them an adequate stock of fuel and ammunition for replenishment and this stock will have had to be carried forward with them in the initial attack by armoured vehicles. Where the air situation is such that for special operations fighter cover can be spared to create local air superiority, air dropping or the use of helicopters may prove to be the most satisfactory means of re-supply. It is most unlikely that we should have such resources at our disposal, however, in the early stages of a war. The type of operation for which such support is envisaged is a large night attack by an armoured force of all arms bursting through a temporary gap in the enemy's position made by the use of atomic weapons, followed by large scale exploitation.

It follows that formations must be more mobile and administratively more self sufficient than is common practice today with a highly developed system of forward control. The commander will be forced to be either right forward or right back and experience has proved that in modern war there is no room for the remote-control commander.

(b) *Training and Equipment*

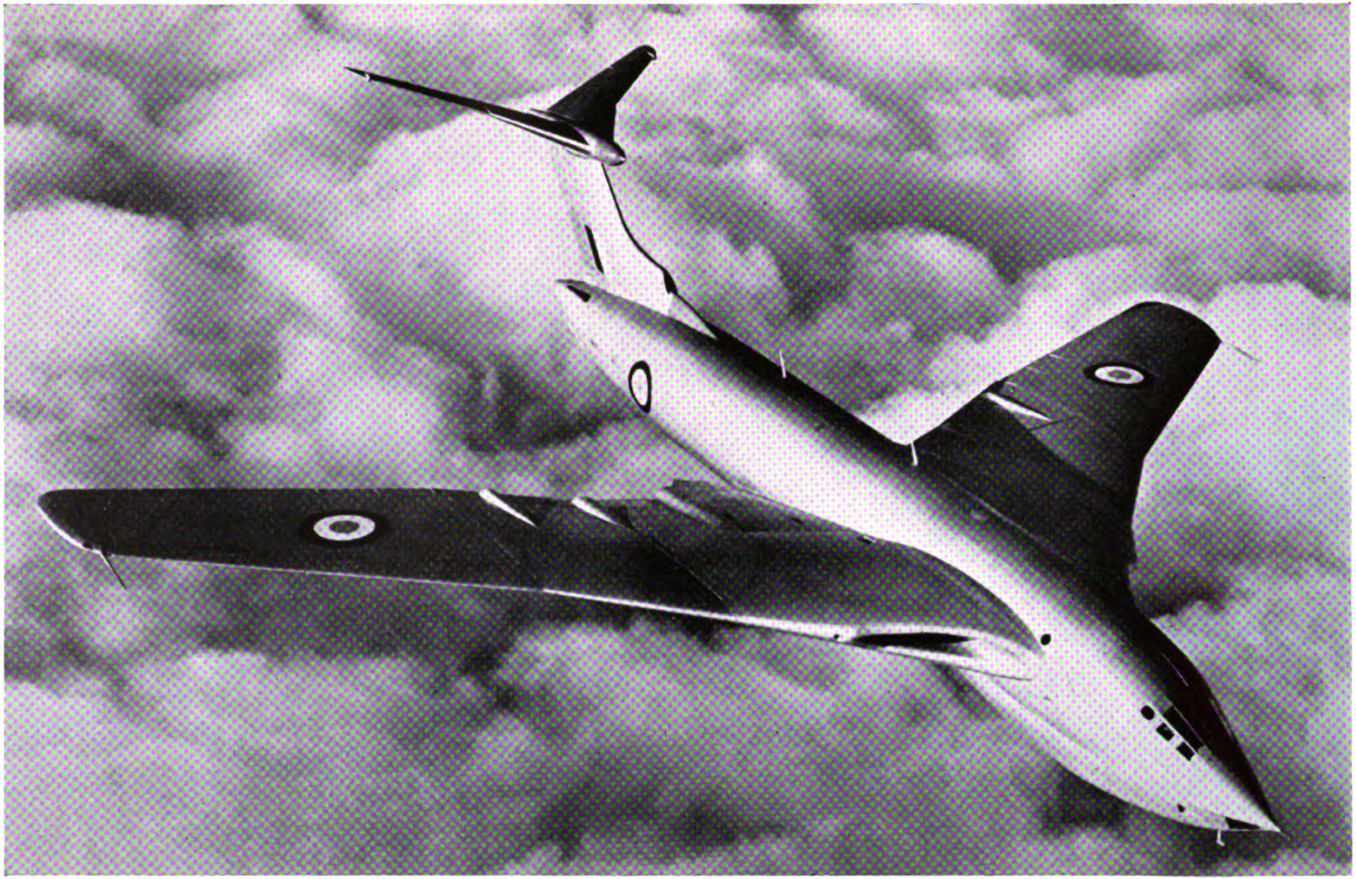
Although there are many ways in which science could assist the soldier to fight at night—particularly by improving his ability to see and to maintain direction—it is significant that the successes of the past have been achieved without such assistance and that formations have generally evolved means of helping themselves from within their own resources. This has been possible because the formations were basically well trained and, in many cases, experienced in battle.

The importance of this adaptability lies in the fact that the introduction of special, and often complicated, equipment will reduce flexibility and will mean either that troops have to be trained to use it before an operation can be mounted or that special units, trained in its use, must be maintained in readiness. This latter course is not only uneconomical but is patently absurd if the Army as a whole is to become proficient in night fighting. Furthermore, such measures would complicate an operation in which simplicity is of paramount importance.

The answer therefore lies in the development of simple equipment which all troops can learn to use from their earliest training. Soldiers must be taught to regard the hours of darkness as being as natural a time for fighting as daylight, so that they can operate almost as effectively by night as by day.

Night Vision and Direction Finding

There is a requirement for the development of night firing sights for small arms and for AFV's. There is also a need for direction finding apparatus, if possible incorporated into, or at any rate no larger than, a manpack wireless set, which can be adapted for use in vehicles. Both these aids should be part of a unit's normal equipment for battle and distributed on a scale down to platoon or troop level, in just the same way as certain weapons are now held by the infantry. The development of this equipment will inevitably present difficulties but these cannot, surely, be more severe than those of many similar problems which have been satisfactorily solved by scientists in the past. It is of great importance that



Handley Page Victor, four Armstrong-Siddeley Sapphire turbojets

the technique of adaption and improvisation should not be forgotten and that the use of compass, artificial moonlight, marker shells, Bofors tracer, artillery fire, and route marking equipment (tape and lights) should be frequently practised in night training. In addition such training must aim to develop the soldier's natural faculties for night movement; remarkable progress can be made in this direction if the training is imaginative and really testing. In the early stages it should be made competitive wherever possible.

Flame

By the end of the Second World War the Crocodile flame-thrower had become so well-known upon the battlefield that it could no longer be regarded as special equipment. It is to be assumed that we may expect to continue to see flame-throwing tanks in quantity in the future. Great as the morale breaking effect of these weapons may be by day, it is infinitely greater by night. Although no first hand reports are available of the part played by the Crocodiles in "Totalize," the historian of the 79th Armoured Division describes their employment in support of the 53rd (Welsh) Division in the crossing of the Wessem Canal in November, 1944, saying that "the effect in the darkness was devastating and the enemy greatly demoralized." Whenever possible flame-throwing tanks should be made available to the follow-up elements of a large night assault to assist in mopping-up the isolated points of resistance by-passed by the assaulting echelons.

CDL

Considerable controversy has raged over the merits of CDL, a project upon which very large sums were spent in the last war but which was never used for its proper task and, indeed, barely used at all. Describing this equipment in his book *The Second World War* General Fuller writes: "The C.D.L. was an infantry tank fitted with a powerful projector of special design emitting a fan-shaped flickering beam of light which illuminated a wide field and dazzled the eye. The projector was so protected that it could not be put out of action by anything less than a direct hit by a shell which could penetrate five inches or more of armour.

"The object of this weapon was to solve the problem of night fighting on a large scale, enabling an attack to be carried out more methodically and rapidly than during daylight, and far more economically and securely; for whereas the field over which the attacker advanced was brilliantly illuminated, all the defender was able to see was a wide expanse of dazzling light which obscured everything behind it, and which was so brilliant that it rendered aimed fire impossible.

"The letters C.D.L. stood for 'Canal Defence Light'; a name adopted in order to conceal its true use and purpose. Like the word 'tank', it was a verbal camouflage."*

As already stated, the establishment of formations with highly specialised equipment of this type is an extravagance which we cannot afford, at any rate in the early stages of a war, but there is no doubt that CDL had great possibilities and under certain circumstances, it might be worth resuscitation. In the meantime it would be worth exploring the possibilities of producing an armour protected light of this type which could be mounted externally upon a conventional tank with a view to the equipment of, say, one troop per armoured squadron in this manner. There is no doubt that, cleverly employed, such lights might prove invaluable in defence and in the pursuit.

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* Fuller, *The Second World War 1939–45*, p. 413.

Battle Procedure

Stress has already been laid upon the need for simplicity in the conduct of night operations. One of the most effective means of preserving simplicity is by the issue of crystal clear operational standing orders within formations so that orders for specific operations may be kept as short and as simple as possible. For example, the chaos which must ensue upon the battlefield during any resisted advance at night can be greatly reduced and the movement of supporting echelons (particularly those charged with the exploitation of the initial attack) made possible, if standing instructions on traffic discipline in battle are known and have been practised continually by every unit in the formation. Without them the chances of a night attack ever developing into a successful breakthrough are almost nil. These operational standing orders are additional to any standardised procedures already laid down for the Army as a whole—correction of artillery fire, wireless procedure, indication of targets to tanks by infantry, to name only a few—and must not be allowed to take their place. There is a grave danger after an Army has been at war for some little time, and formations have formed their own habits and customs, that the well defined universal practices will be dropped in favour of these "local rules"; it does not require much imagination to realise how serious the effect upon a night operation might be if cooperation with the supporting units broke down through lack of mutual understanding. This does not, of course, apply only to night fighting but at night the importance of such matters increases to the extent of being vital to success. The existence of standing orders and standing operational procedure is useless unless the troops concerned are so well versed in them that compliance with them becomes almost automatic.

(c) *Summary*

The adverse air situation likely to confront us in the early stages of a future war will compel us to make more and more use of the night, not only for movement but for fighting. This will bring with it certain associated problems, particularly those of maintenance and of control, but none which have not either been faced and overcome in the past under similar circumstances or which cannot be mastered by a well trained, tough and disciplined army.

Whilst the addition of certain items of equipment would greatly facilitate night operations, the fundamental requirement is to produce troops who are highly skilled in the use of their basic weapons by day or night and who have acquired real confidence in their ability to move and fight in darkness.

CONCLUSIONS

There is no magic about night fighting. It is simply a matter of training based on sound battle procedure, but the soldier whose unit is trained to fight by night as by day will acquire great confidence, not only in his unit but in himself. Such confidence breeds high morale, which is a prerequisite for success in battle.

The provision of a limited quantity of night fighting equipment is desirable, but not essential.

With a night trained army the disadvantages of numerical inferiority and an adverse air situation can be very appreciably reduced. Furthermore, it becomes possible to seize fleeting tactical opportunities which, if pressed home, may pay incalculable dividends.

We have now the time and the opportunity to achieve the standards required and to learn by experience how best to train in night fighting a greatly expanded army in war.

H. B. C. WATKINS

CHAPTER XXX

TRAINING IN THE ROYAL AIR FORCE

By Wing Commander J. A. Holmes

The demand on the Royal Air Force Training organisation for large numbers of aircrew has eased during the past years. The main burden has passed to the operational commands and squadrons where the young aircrew, recently graduated from training, must be brought to full operational efficiency on the new aircraft with which the expanded front line is being equipped. This does not mean that the training organisation has entered a period of relaxation. Rather that an opportunity has been given to review policy, and to introduce a new sequence of pilot training, which is described later in this article.

Under the stress of expansion there was a natural reluctance to turn down would-be aircrew candidates with the result that too many pupils of borderline ability survived successive stages of training only to fail at a later hurdle. Undue perseverance with aircrew of marginal ability has proved a false economy leading to late and expensive wastage. This has been rectified by improved selection at first entry and a firm suspension policy applied at all stages of training. More time is now spent during flying training, particularly on jet aircraft, and the standards of instruction have been improved by longer courses at the Central Flying School, by a better flow of pilots from operational commands to training, and by the accumulation of jet training experience at the Jet flying schools. These factors have combined to improve standards and lower the accident rate during flying training.

FLYING TRAINING

The sequence of flying training in use during 1953 is shown in the diagram (facing p. 318). This covers all aircrew categories and shows their progress through Flying Training Command and the Operational Conversion Units. All volunteers for aircrew, other than Cranwell cadets, whether for Regular or National Service, are first interviewed by the Aircrew Selection Board at Hornchurch. Candidates between the age limits of 17½ to 26 years undergo a series of intelligence, educational and aptitude tests from which their suitability for the various aircrew roles can be assessed.

Pilots and Navigators accepted for training by the Selection Board receive a course of initial training lasting 12 weeks. Recruits are drawn from all walks of life; some from previous civil employment; others direct from school, so that initial training is mainly designed to provide a sound knowledge of service methods and discipline, and to develop physical fitness and initiative. All cadet pupils who successfully pass their initial training are commissioned as Acting Pilot Officers on probation. After initial training both Regular and National Service pilots carry out their flying training at Royal Air Force Flying Training Schools. During 1953, this entailed a 48 weeks course including 65 hours basic instruction on the

Percival Prentice, or De Havilland Chipmunk and 135 hours applied instruction on the Harvard or Balliol. This pattern is now steadily being replaced by the Provost/Vampire sequence which was launched at No. 6 F.T.S., Ternhill, in September, 1953.

During the year the Rhodesian Air Training Group closed down and the Civil basic flying schools which, for many years in war and peace, have contributed to the training of R.A.F. pilots, ceased to function. The Royal Canadian Air Force, however, continued to train a large number of pilots for the R.A.F. In Canada all basic training is undertaken on the Harvard. Previously R.A.F. pilots trained in Canada returned to England for advanced flying on jet aircraft but the R.C.A.F. has now opened its own Jet A.F.Ss. using the Lockheed T.33 Silver Star. R.A.F. pilots therefore complete Jet training in Canada and are ready to go to an operational conversion course on their return to U.K. after a short period of acclimatisation.

Prior to the introduction of the Provost/Vampire sequence pupil pilots qualified for "wings" after 200 hours devoted entirely to training on piston-engined aircraft. Thereafter conversion to jet aircraft was dealt with in a course of 65 hours at the Advanced Flying Schools. Experience has shown that this amount of jet flying is not enough for the safe and efficient handling of expensive operational aircraft. The modern Air Force demands pilots who have reached the highest possible proficiency in jet flying during training. The new Provost/Vampire sequence therefore aims to give more jet flying, much earlier in the pilot's career than hitherto. Jet aircraft, disarmingly docile on circuit flying in fair weather require quicker reactions, quicker decisions in airmanship, and greater precision in handling than piston aircraft, if their powers are to be fully and safely exploited in all weather throughout their wide range of speed and altitude. These qualities cannot be properly developed by lengthy training on piston aircraft in which the conditions of jet flight and the technique of jet aircraft and engine handling cannot be effectively simulated.

After 200 hours spent on the Prentice and Harvard before introduction to jet flight piston habits become firmly ingrained and are apt to gain ascendancy in emergency with serious results when wrongly applied to jet aircraft. Some of the difficulties at the jet Advanced Flying Schools during the past five years have been less the result of too little flying experience than of too much experience on the wrong type of aircraft. It has also been found that too many pilots, after long training on piston aircraft, later fail on jets. Thus 200 hours of flying training have been wasted. The new sequence aims to spot this wastage much earlier, thereby eliminating unnecessary effort and expense.

The Provost and Vampire cover in two well graded stages of 120 hours and 110 hours respectively what the old sequence did in three. Both aircraft are British built trainers with side by side seating and excellent handling qualities. They are very similar in cockpit layout and to some extent the handling characteristics of the Provost resemble those of the Vampire. They are certainly far better matched to each other than were the Prentice, Harvard and Meteor. The Provost should enable the pupil pilot to approach the Vampire with confidence while the Vampire itself, though relatively simple to fly, can demonstrate all the characteristics of jet flight and develop the necessary speed of reaction. By contrast the Prentice was too simple to fly, leaving the bad pilot undetected until the Harvard stage, while the twin-engined Meteor with higher power and wing loading than the Vampire is a big step for the pilot with no previous jet experience.

From early 1954 onwards all R.A.F. pupils trained in the United Kingdom will go first to a Provost F.T.S., and then to a Vampire F.T.S. to complete flying training for the award of wings. The A.F.S. stage has therefore been eliminated. Provost and Vampire training cannot conveniently be combined at one airfield but each Provost school will be linked to a corresponding Vampire school. The two will thus be able to operate in close partnership and maintain a mutual check on the progress of pupils in each stage of training.

The versatility of the Provost is such that pilots at the Provost schools will be able to cover on the one aircraft most of the syllabus previously given on the Prentice and Harvard. Despite its 550 H.P. Leonides engine the Provost is tractable and pleasant for the beginner to fly. Light controls ensure the development of sensitive touch and are calculated to reveal the errors of the ham-fisted pupil. In fact the Provost has a rate of roll which surpasses that of the Meteor. Its power rate of climb, manœuvrability, and comprehensive equipment provide the required facilities for more advanced flying exercises and, incidentally, ensure that each hour of flying is really productive. So often in the past a fair slice of each training sortie has been absorbed in climbing to effective height for aerobatics, spinning, or navigation exercises. The Provost syllabus of 120 hours includes general handling, full range of aerobatics, elementary and advanced navigation exercises, instrument flying to white card standard, night flying and an introduction to formation flight. As in the past flying goes hand in hand with ground studies including Aerodynamics, Meteorology, Engines and Airframes, Navigation and Airmanship.

Already four pilot courses have entered training on Provosts at 6 F.T.S., Ternhill. Results to date indicate that the new conception of basic flying training is fully justified. Pupils have taken well to the Provost; those who possess the aptitude required by the Service have gone solo in 12 hours on the average. Though longer than the average time taken on the Chipmunk and Prentice it is short enough to ensure that the confidence and initiative of pupils are not sapped by too much pre-solo dual. Attempts to use the Harvard for the beginner have always been handicapped because the difficulty of flying the aircraft necessitated some 20 to 25 hours dual instruction prior to solo. Pupils tend to lose faith in themselves after so much nursing. The Provost has struck the happy mean and provides the R.A.F. with a basic trainer which has no counterpart in other Air Forces.

From the Provost schools pilots go to the Vampire F.T.S. The introduction of jet flying earlier in the training sequence makes it part of progressive training to the wings stage, not merely a conversion phase after "wings" standard has been reached on piston-engined aircraft. Instructors taking over pupils for Vampire training will not expect them to be finished and capable pilots; their pupils will still be learning to fly so the pace of instruction and care in supervision will be matched to the new requirement. Nor will the pupil pilots approach jet flying with any of the false confidence which the award of wings on piston aircraft sometimes engendered. The syllabus of 110 hours flying on the Vampire will consolidate and advance the pilots' skill in general aircraft handling, at the same time adapting previous experience to the techniques of jet flying. Pupils will not roar up to 40,000 feet and try to break the Sound Barrier the first time they step into a Vampire but, as training proceeds, they will gradually be shown how to exploit the high speed and high flying capabilities of the jet aircraft. Nevertheless those who lack the speed of reaction and co-ordination required for jet flying should be spotted at an early stage in the Vampire course. The Vampire T.11 with side by side seating, fully duplicated controls, and ejector seats is used for dual instruction. Single seat Vampire 5s. and 9s. are used for solo exercises.

As with Provost basic training Vampire flying will be backed by ground studies in which the emphasis will be laid on the principles of high speed flight and turbo jet engines; high altitude meterology, high level navigation, and airmanship. In particular pilots must absorb a thorough understanding of the factors affecting range and endurance for jet aircraft.

By the time successful graduates receive their "wings" they should be masters of the Vampire in all conditions of flight by day and night, in good and bad weather. It is significant that all pilots, even the small number who may be destined for service on piston-engined aircraft in Coastal and Transport Command, must now qualify on jet aircraft during training.

At the time of writing the Provost pilot has yet to be tested in the Vampire stage of the Provost/Vampire sequence. The first Vampire F.T.S. started operation at R.A.F. Oakington, in April, 1954. Those who have watched the progress of Provost training feel confident that the earlier start on jet flying is unlikely to present serious difficulty. Providing pupils make this step—without accidents—the Provost/Vampire training sequence should represent a great step forward in producing the right type of pilot for the operational squadrons of the modern Air Force.

In direct cost the new sequence is slightly more expensive than the old. In practise increased cost may be offset by the reduction in overheads for a two stage, two aircraft sequence, by simplfied servicing and spares backing, possibly by savings in manpower, and above all by the production of better qualified pilots.

At present the Vampire stage makes no provision for specialisation according to future rôle whereas in the old sequence jet training was undertaken at both Day Fighter and All Weather Advanced Flying Schools, the latter featuring a larger proportion of instrument and night flying. With the increased time available at the Vampire F.T.Ss. it is hoped that all aspects will be adequately covered by all pilots but experience may show that some specialisation towards the end of Vampire training is possible and desirable.

Pilots destined to fly piston-engined aircraft in Coastal and Transport Commands, whether trained on the old or new sequence, will continue to undertake a course of 60 hours in 10 weeks on the Vickers Varsity at No. 201 A.F.S., Swinderby. This unit also provides advanced training for navigators and signallers and gives all aircrew categories an introduction to their responsibilities as members of a flying team.

On completion of jet flying training successful pilots are awarded wings and pass from Flying Training Command to the Operational Commands for further instruction in the various operational rôles. Pilots are allowed to state their preference for a particular branch of the Service, Bomber, Fighter, Coastal or Transport. This choice is balanced against the recommendation of the Training Staff and also, of course, against the pilot requirements of each Command.

The pattern of pilot training is closely followed by navigators who pass from initial training, which they share with pilots, to the Air Navigation Schools. The bulk of R.A.F. navigators are now trained at navigation schools in Canada where they receive 94 hours basic instruction in Dakota and Expeditor aircraft, followed by 60 hours applied instruction in the same aircraft. Navigators are awarded the flying badge after successful completion of the A.N.S. course and continue with further training at an appropriate Command School. Navigators returning from Canada carry out a 10 weeks acclimatisation course at Thorney Island on Marathons and Valettas.

Both pilots and navigators are confirmed in their commissions as Pilot Officers on a 12 years' engagement for "regulars," at the end of F.T.S. and A.N.S. training respectively. They can, however, opt to leave the Service after 8 years with a reduced gratuity. A small proportion fail to reach the standard required to undertake the duties and responsibilities of officer rank. These are given the option of continuing with flying service as N.C.Os. or taking a discharge to the Reserve on completion of the normal period of National Service. The length of training before going to an operational squadron for Regular and National Service pilots (other than Cranwell cadets) is approximately 18 months on the old sequence and 16 months on the Provost/Vampire sequence.

Signallers undergo initial, basic and advanced training on a fifty-weeks course at an Air Signallers School. Those destined for Bomber and Transport Commands join with pilots and navigators at the piston-engined A.F.S. for further experience in Varsity aircraft. Coastal Command signallers continue at the School of Maritime Reconnaissance after an 8 weeks Gunnery Course. Operational crew training is then completed at the O.C.Us. During 1953 academic selection standards for signallers have been raised to the same level as those required for pilots and navigators.

Engineers and Gunners are no longer found from direct entry aircrew, these categories are now filled by training volunteers from serving airmen. Both Engineers and Gunners receive eight weeks initial training at a technical school. Engineers then carry out 12 weeks specialised flight engineer training at an O.C.U. before crewing up to complete a normal O.C.U. course. Gunners also join a crew for operational training at the O.C.U. having first completed an eight weeks course at the Central Gunnery School.

The training of pilots, navigators and other aircrew categories prior to the O.C.U. stage is undertaken by Flying Training Command through the medium of three Group Headquarters:

> *No.* 21 *Group* is responsible for the initial training of pilots and navigators which is now centralised in one school at Kirton-in-Lindsey (Lincs). This Group also controls the air training of navigators and signallers.
>
> *No.* 23 *Group* with Headquarters at Leighton Buzzard controls all piston-engined Flying Training Schools which, at the present time

include both Prentice/Harvard schools and the new Provost F.T.Ss. For this purpose Flying Training Schools are established at Moreton-in-Marsh (Glos.), Feltwell (Norfolk), Ternhill (Shropshire), and Cluntoe (N. Ireland). 23 Group also controls the F.T.S. at Syerston which trains pilots for the Royal Navy, the piston-engined refresher school at South Cerney and the Central Flying School.

No. 25 *Group*, based at Manby (Lincs) is charged with the conversion and training of pilots on jet aircraft. For this task the Group controls the Meteor and Vampire Advanced Flying Schools which are gradually being replaced by Vampire F.T.Ss. as the Provost/Vampires sequence gets under way. At present the Jet A.F.Ss. in operation are Merryfield (Somerset), Weston Zoyland (Somerset), Worksop (Notts.), Oakington (Cambs.), Driffield (Yorks.), Middleton St. George (Durham), and Valley (Anglesey); of these the last four are scheduled to re-equip as Vampire Flying Training Schools. Weston Zoyland's primary task is familiarisation and refresher training on jet aircraft for pilots on staff appointments.

OPERATIONAL TRAINING

In Flying Training Command pilots and navigators have devoted their time to the development of skill in pure flying and navigation. They have not specialised in any particular role nor have they learnt to apply their skill by operational practise, either as individuals or as members of a regular crew. The next step in training therefore takes place at one or other of the Operational Conversion Units (O.C.Us.). These units are controlled by the appropriate Operational Commands who are in the best position to ensure that operational training keeps pace with the development of new operational tactics, techniques and equipment. Just as Flying Training Command removes the burden of instruction in pure flying and navigation from the O.C.Us., so the O.C.Us. ensure that pilots and crews reach the first line squadrons with a sound knowledge of their operational rôle, and with the ability to perform as an effective fighting unit after the minimum of squadron training. The O.C.Us. are staffed mainly with pilots from the operational squadrons. A regular turnover of staff ensures that pupils get the benefit of up-to-date, first-hand experience in training for their future tasks. Naturally the type of training varies widely with the operational role. The operational techniques and devices in the Maritime role, for example, bear little resemblance to those employed in Bomber Operations. Similarly the length of O.C.U. courses varies according to the complexity of the equipment to be mastered and the amount of crew training required to produce an efficient operational team. Thus a Day Fighter pilot spends 8 weeks at a Fighter O.C.U. where weapon training, gunnery practice and fighter tactics are the main features in a course of 30 flying hours. At the other end of the scale O.C.U. courses at the Coastal Command O.C.Us. covers approximately 100 hours flying in 12 weeks, during which conversion to the Shackleton and Neptune is followed by training in the techniques of Maritime reconnaissance and anti-submarine warfare which demand not only first-class crew co-operation but also the ability to work with surface vessels.

The development of scientific aids to improve the effective hitting power of modern aircraft has greatly increased the knowledge and skill required of aircrew. In Bomber and Maritime operations particularly, the study of radar aids to navigation and detection calls for the attendance of aircrew at the School of Bombing (Lindholme) and School of Maritime Reconaissance, respectively, prior to the O.C.U. stage.

Modern front-line aircraft are so costly to produce and run, that where possible without serious loss of efficiency reliance must be placed on other aircraft, often the ex-operational type, for certain stages of O.C.U. training, e.g. Varsities for bombing training, Lancaster G.R.IIIs. for maritime training. With the advent of the highly expensive V bombers greater use is likely to be made of operational flight simulators which can now faithfully reproduce the cockpit layout and handling characteristics of new aircraft over their full range of performance. All the emergencies likely to be met with in actual flight can be "fed" into their simulators which should improve efficiency and save flying hours in the conversion of well-qualified aircrew. They cannot, however, reproduce the psychological element of risk nor can they provide those physical reactions on the "seat of the pants" which despite modern instrumentation are still a factor to help or hinder the pilot in actual flight.

The Operational Conversion Units, by types being operated in the R.A.F. are as follows:

- Fighter Command
  - Combined Day Fighter and Fighter Reconnaissance O.C.Us.
    - Meteor T7, F.8, FR9, Vampire 5B, Vampire T.11.
  - Day Fighter/Ground Attack O.C.Us.
    - Vampire T.11, 5 and 9.
  - All weather and Night Fighter O.C.Us.
    - Meteor T.7, Meteor NF.11, and Vampire T.11.
  - Light Aircraft School
    - Auster 5, 6, and 7, and Chipmunks.
- Bomber Command
  - Medium Bomber O.C.Us.
    - Pending the introduction of the Valiant medium bomber operational training on the Lincoln is given at unit level only.
  - Light Bomber and Target Marker O.C.Us.
    - Canberra B2 and Mosquito aircraft.
  - Short and Long Range Photographic Reconnaissance O.C.Us.
    - Meteor T7 and PR 10, Canberra P.R.
- Coastal Command
  - Long-range Maritime Reconnaissance O.C.Us.
    - Sunderland, Shackleton, and Neptune aircraft.
- Transport Command
  - Long-range and Medium-range Transport O.C.Us.
    - Hastings and Valetta aircraft.

The successive stages of aircrew training make steadily increasing demands on the ability, intelligence, and stamina of the pupil as the field of instruction widens and the tempo of flying intensifies. Some pupils, unable to attain the standards required, which have remained high even under the stress of expansion, are suspended at each stage. Those who successfully complete O.C.U. Training are ready to take their place in the operational squadrons in the rôle for which they have shown most aptitude during training.

INSTRUCTOR TRAINING

High quality aircrew cannot be produced without a highly competent body of instructors, who need not only skill and knowledge but also enthusiasm, good instructional technique, and up-to-date personal experience of the operations for which their students are being prepared. In past years the demand for rapid expansion coupled with a shortage of instructors led to unduly long tours of duty for instructors in Flying Training Command. Many instructors were away from operational flying for as much as five years, some had never gained experience with the operational commands. This situation induced a stalemate which has only recently been broken down. The operational commands preoccupied with manning newly formed squadrons were naturally reluctant to release pilots for instructor training, particularly when, in the case of short service officers, they were often lost to the parent command. At the same time advances in aircraft performance and operational technique have been so pronounced in recent years that the operational commands were not particularly keen to absorb instructors who had lost touch with modern flying or become aged in the flying Training Organisation. Thus there was little of the healthy circulation of personnel between the training organisation and the first-line squadrons which is essential for the well-being of both training and Operational Commands.

Fortunately the dangers of in-breeding have been obviated by a more generous attitude on the part of the Operational Commands in releasing experienced pilots and navigators to the central instructors schools, and by a new policy for the length of instructional tours. The maximum instructional tour for officers holding Short Service or Permanent commissions is now 2½ years. By these measures the flow of young, enthusiastic and operationally experienced pilots to the training units has been greatly stimulated. Their presence cannot fail to give greater encouragement and incentive to the embryo aircrew.

The Operational Commands in turn have found that the ex-instructors, whom they are now more freely accepting back to squadron service bring with them a high standard of flying skill and teaching know-how which can be put to good use in raising the standard of young aircrew in the squadrons. In addition the introduction of two new aircraft, the Provost and Vampire, to the training sequence, has given a great lift to the morale of flying instructors, who no longer feel, as they did on the Prentice and Harvard, so completely divorced from up-to-date aircraft.

The task of training instructors is vested in the Central Flying School, Navigation School, and Central Gunnery School. During the year the Central Flying School has increased the length of its course from 16 to 21 weeks, both to improve the quality of graduates and to provide the flying staff with regular opportunities for improving their own standards by continuation training and by liaison visits to the operational squadrons at home and overseas. The Central Flying, and Navigation Schools continue to exercise their watch over flying standards, throughout the R.A.F., through the medium of the C.F.S. Examining Wing, and the Navigation

Categorisation Flight. These teams spread the latest instructional technique by visits to training units and operational squadrons at home and overseas. To carry out their duties the staff of the Examining Wing, all A Category instructors, make a point of regular flying in all types of aircraft in R.A.F. service. C.F.S. also presides over instructional technique conferences which act as a link between all stages of training and between the training organisation and operational commands. In this way the training syllabus and the emphasis on particular flying exercises are adjusted to meet the changing needs of operational flying.

1953 has seen the formation of a helicopter development unit under the wing of C.F.S. In this field the R.A.F. has so far been outstripped by the Navy who have found many uses for the rotary wing craft apart from its undoubted advantage over the breeches buoy as a dignified form of ship to ship transport for flag officers. The R.A.F. helicopter unit, though small, may well be the nucleus for a full scale helicopter training unit.

POST GRADUATE TRAINING

In foregoing paragraphs the pattern and some of the problems of aircrew training have been described. R.A.F. training, like a liberal education, is never complete. Indeed every task undertaken by the R.A.F. in peacetime, be it the Coronation fly-past or live operations in Malaya, has training value in one form or another. Outside the normal pattern of aircrew training several new Schools, courses, and other training facilities have been introduced during the past few years. For fighters—more air firing in O.C.Us. and squadrons; more practice camps; higher and faster target towing; more practical cine gun exercises; an A.I. school for navigators in the all-weather fighter rôle, and special courses at the Central Fighter Establishment for day fighter leaders, air-to-air and air-to-ground attack instructors. For bombers—intensive bombing training at the recently established Bombing School and more adequate range facilities and exercises for squadrons. For maritime aircraft, the School of Maritime Reconnaissance and the Joint Anti-Submarine School provide well-co-ordinated facilities for anti-submarine training, while a training flight at Malta enables home based squadrons to exercise with ships and submarines in the good weather of the Mediterranean. All these post-graduate facilities are provided to improve the knowledge, skill, and accuracy which aircrew apply to the operational task.

At a higher level the Staff Colleges and the Royal Flying College at Manby provide senior officers of the G.D. branch with the staff training and practical knowledge of up-to-date operational aircraft and techniques which is essential for the successful prosecution of air warfare. All new conceptions, such as the Flying College, require time to evolve and mature before their full worth can be realised. After four years of operation the Flying College has become the leading Air Force centre for operational knowledge. In a course of eleven months all aspects of air warfare are covered both in relation to current aircraft, aids and weapons, and to the likely trend of future development, including the growing science of guided weapons. A wealth of information is focused in the operational studies section which reflects the progress of to-day and to-morrow rather than the achievements of yester-year. To give point and reality to theory the senior wing commanders and group captains who attend the course are invited to take the air and put their studies to the test. Most of the flying is done in Meteors, Canberras, and Lincolns. Students at Manby must forget "senior officers" flying weather and be prepared to operate in all weather by day and night.

The Flying College is not cheap to run but its graduates are unlikely to repeat some of the errors of the past when poorly armed aircraft were sent to attack heavily defended targets which they had not the power to destroy even if they were successful in locating and hitting the objective. Command of modern air power calls for a broad basis of knowledge, a scientific outlook, and foresight. These the Flying College aims to supply and stimulate.

FUTURE DEVELOPMENTS IN TRAINING

As foreshadowed in the introduction to this article the increased cost and hitting power of modern bombers and fighters such as the Valiant and Swift may reduce the requirement for aircrew, and will certainly emphasise the need for quality in captains and aircrew. The Provost/Vampire sequence is designed to produce highly qualified pilots but the first pupils have yet to graduate. Experience may show that more time and more flying hours are needed in the F.T.Ss. and O.C.Us. to produce the quality which smaller numbers of aircrew must match against greater responsibilities. Judgment on these matters must await the results of training during 1954. Meanwhile plans are in hand for new systems of aircraft control, improved airfield lighting, more effective and comprehensive instrumentation for all-weather flying, development of flight simulators, and the introduction of new aircraft such as the dual Canberras and Vampire T.11 to O.C.Us. and squadrons.

The biggest question mark in pilot training is drawn around the possibility of basic training on jet aircraft. Can a pilot be trained on a jet aircraft from the start? Is it practicable, is it necessary, is it economical? The arguments in favour of such a step are strong enough to warrant a practical experiment to discover the answers. A Jet version of the Provost with an Armstrong-Siddeley Viper engine is expected to fly in May, 1954. Ten of these aircraft have been ordered for a controlled experiment in basic jet training which should begin by Spring 1955 after preliminary evaluation trials of the Jet Provost at Central Flying School.

MAIN OPERATIONAL RÔLES OF THE ROYAL AIR FORCE

The pilots, navigators, and other aircrew produced by the Flying Training Organisation take their place in the first-line squadrons and continue to develop their fighting efficiency by carefully planned programmes of squadron training and by participation in air exercises which are held every year to test the organisation, communications, and battle readiness of the R.A.F. in its main operational rôles.

Home Defence

Fighter Command is charged with the defence of the United Kingdom against air attack. Anti-Aircraft Command, under the operational control of Fighter Command, and some 20 fighter squadrons of the Royal Auxiliary

Air Force, assist in this task. Effective interception depends upon early and accurate warning of enemy approach. Rapid presentation of information from the radar screen and Royal Observer Corps is a vital prerequisite to success, and improvements in this field are continually sought during research and training.

The aircraft employed are Meteor 8, Vampire 5 and 9, Meteor night fighter N.F.11, Venom night fighter N.F.2. Fighter Command is also re-equipping with its first swept-wing fighters, including the Swift and Sabre.

Strategic Bombing

Bomber Command is responsible for the direction and control of strategic bombing through the medium of No. 11 Group, Bawtry (Yorks.) and No. 3 Group, Mildenhall (Suffolk). In its secondary rôle Bomber Command provides support for the other services. With the completion of the Canberra re-equipment programme Bomber Command has greatly increased its knowledge and experience of high-altitude jet bomber operations, thereby providing a sound foundation for exploiting the greater reach and striking power of the Valiant which is scheduled to enter squadron service during 1954. Bomber Command's flying effort for 1953 has shown the remarkable increase of 193% over that achieved in 1952.

The Washington has left the scene and Lincolns and Canberras are the main aircraft employed pending the arrival of the Valiant. Canberras have also taken over photo recce. and target marking.

A significant contribution to bombing accuracy has already been made by the recently established School of Bombing.

Defence of Sea Communications

Coastal Command, in conjunction with the responsible navies, is responsible for safeguarding sea communications. The maritime air forces, with the Royal Navy also provide a strong British contribution to Atlantic defence within N.A.T.O. Coastal Command exercises control through No. 18 Group (Dunfermline), No. 19 Group (Plymouth), and R.A.F. Gibraltar.

The aircraft employed are the Shackleton and Neptune, both capable of very long range for reconnaissance, anti-submarine search, and escort duties. Each is equipped with the latest sonic, radio and radar devices for submarine detection and attack. The Sunderland, by no means eclipsed by the more modern landplanes, still plays an irreplaceable part in maritime air operations, but sadly needs the support of an up-to-date flying boat. Past experience in the shifting fortunes of war has shown that the defiles of maritime warfare cannot always be predicted nor can prepared bases be constantly maintained to cover all the possible battlegrounds on the oceans of the world. But the coasts and islands of the seas afford liberal anchorage, which at the critical moment may provide the flying boat with a vital advantage in reach, denied to its landbased sister. Fortunately the Sunderland, despite its veteran design, has ensured the retention of aircrew trained in flying boat operation.

Development, trials, and tactical application of weapons and devices for maritime aircraft are undertaken at the Coastal Command Air/Sea Warfare Development Unit in Cornwall.

Transport Rôle

Transport Command with headquarters at Upavon (Wilts.) is responsible for the carriage of personnel and equipment at home and overseas, and between home and overseas establishments, for the R.A.F. and other services. It also provides aircraft for airborne assault and air supply. Other tasks include the delivery of aircraft to and from overseas bases, which is undertaken by the Overseas Ferry Unit, and the air evacuation of casualities. Transport Command helps to maintain the standards of transport aircrew world wide with the assistance of the Transport Command Examining Unit which checks the efficiency of all transport squadrons at home and overseas.

The aircraft employed are the long range Hastings and Medium Range Valetta, but pilots of the Ferry Unit gain experience of many different types during delivery flights.

Tactical Rôle

Tactical Air Forces are composite formations including light bomber, fighter, ground attack, and reconnaissance squadrons. They provide air defence for their area and give support to associated land forces. There are three mainly tactical formations in the R.A.F.:

2nd T.A.F.—Germany.
Middle East Air Forces—H.Q., Ismailia.
Far East Air Forces—H.Q., Changi, Singapore.

2nd T.A.F. with elements of the Netherlands and Belgian Air Forces forms the 2nd Allied T.A.F. which, under R.A.F. command, shares with 4th Allied T.A.F. the provision of air support for Western land forces in Europe.

Aircraft equipment of 2nd A.T.A.F. includes Sabres, Meteor N.F.11, Venom, Vampire 9, Meteor P.R.10, Thunderjet.

Middle East Air Force Headquarters operates through No. 205 Group, Fayid; No. 206 Group, Abyad; H.Q. British Forces Aden, A.H.Q. Iraq, and A.H.Q. Cyprus. A.H.Q. Malta has recently been transferred to direct control by the Air Ministry. M.E.A.F. is equipped with Vampire 9 and T.11; Meteor F.R.9, P.R.10, N.F.13; Venom F.B.1, Lancaster G.R.3, Valetta, and Auster. An important Dominion contribution to Mediterranean air strength consists of one R.N.Z.A.F. Vampire squadron at Cyprus and two R.A.A.F. Vampire squadrons at Malta.

Far East Air Force Headquarters controls A.H.Q. Ceylon, A.H.Q. Malaya, and A.H.Q. Hong Kong. The aircraft employed are Vampire 9, Hornet 3/4, Meteor P.R. 10, Valetta, Sunderland, helicopters, and Auster. Operational squadrons have continued to participate in action against communist irregular forces throughout 1953.

OPERATIONAL EXERCISES

1953 provided ample opportunity for all Commands to gain valuable experience in the air. Apart from the major air exercises live operations were carried on in Malaya, Kenya, and Korea, while Bomber, Coastal, Transport, and Training Commands undertook some remarkable overseas flights. The outstanding event was, undoubtedly, the great aerial parade of the R.A.F. before Her Majesty at Odiham on July 15. Not only was this memorable for the honour of the occasion but also for the triumph of organisation and communication which enabled 641 aircraft of differing performance, and flying from widely dispersed airfields, to sweep past the Royal dais in superbly spaced formations over a total period of 27 minutes. This proud and peaceful event brought into play many of the essential requirements for major air operations. The highest degree of skill, precision, timing, and discipline from aircrew. A carefully prepared plan covering routes, rendezvous, navigation aids, marker beacons, altitude, timing, communications, and weather from the staff of No. 11 Group who planned the fly-past. All this was supported by a flexible administrative organisation to provide the extensive ground facilities at Odiham. The excellent concentration in time and space which was achieved provided the R.A.F. with one of the most valuable operational exercises of the year.

The London–New Zealand Air Race provided a further example of the efficiency which can be developed by thorough planning and practice. Moreover it brought to light factors regarding long range high altitude flight with Canberras which might have been overlooked without the stress of keen competition. Despite the various snags encountered on the ground the fact that the actual flight times of all five Canberras fell within a bracket of nine minutes pays a remarkable tribute to the airmanship and navigation of all aircrew taking part. Over a distance of 10,500 nautical miles the fastest aircraft took 22 hours 22 minutes and the slowest 22 hours 31 minutes.

The Canberra Aries IV of the R.A.F. Flying College added to the year's cap of records by flying from London to Capetown in 12 hours 21 minutes during the course of a training flight. Fittingly enough this event took place on December 17, 1953, the 50th anniversary of powered flight. On the same day Flight Lieutenants Burton and Gannon, winners of the Air Race, flew their Canberra to Elizabeth City, Carolina, to represent the R.A.F. at the Kittyhawk celebrations.

In February, following the serious floods in Eastern England, Transport Command, assisted by Coastal, flew in from Europe during five days more than two-and-three quarter million sandbags for the breaches in Britain's sea defences. To assess flood damage and aid the work of repair 16,500 photographs were taken by Bomber Command aircraft. During August Coastal and Transport Commands again assisted the British North Greenland Expedition with air supply by Sunderlands and Hastings. Also flying over Arctic routes were the ferry pilots of Transport Command who completed the delivery of between 300 and 400 Canadian built Sabre fighters by December, 1953, flying to Prestwick via Labrador, Greenland, and Iceland.

Although Air Force participation in Korea ended in July there has been no halt to air action against the terrorists in Malaya whilst the growing threat of the Mau Mau in Kenya has called for air assistance supplied by Harvards and Lincolns. The former were armed and manned at very short notice by the Rhodesian Air Training Group and from all accounts the "blue" note of the Harvard in a dive is liked by Mau Mau even less than the ominous wing spread of the Lincoln.

The Royal Navy's largest Aircraft Carrier, H.M.S. Eagle. A Sea Hawk and a Sea Venom on the flight deck

The following major exercises involving aircraft were held during 1953:

Jungle King—March 16–22

For six days "Jungle King" subjected the operational, administrative and technical organisation of Bomber Command to the stresses of an intensive bombing effort against "Magenta"—an Eastern Power assumed to be attacking westwards. Against air opposition provided by the Allied Air Forces on the Continent, Bomber Command launched strong forces of Canberra aircraft, sometimes attacking at altitudes in excess of 40,000 ft. to a radius of 700 miles. Lincolns and Washingtons joined in the bomber effort while the Lincolns also carried out sea mining against "Magenta" shipping. Summing up after the exercise the A.O.C. in C., Bomber Command said that the organisation and the morale of air and ground crew had responded well to the test but he emphasised that the development of a guided bomb which could be sent without fail to its target from any height and in any weather was a prime requirement if the full potential of the modern bomber was to be realised.

Momentum—August

"Momentum" was designed to exercise the entire air defence system of the United Kingdom under the control of Air Marshal Sir Dermot Boyle, C.-in-C., Fighter Command. Without foreknowledge of attacking force intentions the Control and Reporting system was on its mettle to ensure that raiding aircraft were quickly detected and intercepted. Assisted by auxiliaries and reservists the radar screen and Royal Observer Corps provided raid data for the regular and auxiliary fighter squadrons and A.A. Command, which operated at high pressure over a period of seven days.

Mariner

Exercise Mariner marked a further stage of progress in the difficult task of forging an effective international organisation for Atlantic Defence. Co-operation between the maritime air forces and surface vessels of several nations calls for patient development of common doctrines. Excellent integration of air and surface forces to provide maximum local support for convoys combined with effective anti-submarine sweeps, was achieved during Mariner. The lessons of past exercises had not been forgotten and the success of Mariner will do much to stimulate further improvements in the efficiency of N.A.T.O. naval/air operations. American, French, Canadian, and R.A.F. aircraft took part operating from bases in Iceland, Scotland, Brest, Morocco, Gibraltar, and U.K. An R.A.F. Shackleton squadron based at Lisbon received first-class co-operation and assistance from the Portuguese Government and Air Force.

J. A. Holmes

CHAPTER XXXI

THE DISPOSITION OF BRITISH SEA FORCES

By Rear-Admiral H. G. Thursfield

The First Lord of the Admiralty, Mr. J. P. L. Thomas, in his speech on March 9 this year introducing the Navy Estimates in the House of Commons, announced a long overdue re-organisation of the arrangements by which Her Majesty's Ships are available where they may be needed, for all the multifarious activities that fall to them in all the seven seas. The system which has been in force for more than a century has been that of permanent Foreign Stations, each under a Commander-in-Chief, on each of which are stationed and employed the number of ships, of various sizes and classes, considered appropriate in view of the international situation of the day. The limits of these stations have not varied greatly throughout their existence, though various small re-adjustments have been made from time to time, generally for reasons of immediate expediency. For instance, soon after the outbreak of war in 1914 the Red Sea, which up to that time had been a part of the Mediterranean Station, was detached and transferred to the East Indies Station, and came under the command of the Commander-in-Chief of the latter. In the same way the South Atlantic has at times been considered a part of the America and West Indies Station, and at others has been constituted a separate Station in itself: though the number of ships stationed there has seldom been large enough for the Admiral or Commodore in command of them to be given the status of a Commander-in-Chief—with the higher scale of emoluments that that title carried—but had to be content with the less lucrative position of Senior Officer. Before the outbreak of the late war in 1939, the Navy's Stations outside Home Waters were shewn in the Navy List as follows:

> "*America and West Indies.*" It included the whole of North and South American waters, from mid-Atlantic to mid-Pacific, but South American waters were constituted a separate "Division" of the Station, commanded by a Commodore who was, nevertheless, subject to the Commander-in-Chief.
>
> "*Mediterranean.*" Included both the Red Sea and the whole of the Gibraltar Strait.
>
> "*East Indies.*" Extended from Aden to the northern point of Sumatra, and covered the whole Indian Ocean except that part included in the Africa Station.
>
> "*China.*" All waters east of the Dutch East Indies, including the Malacca Strait, up to the 180th meridian of longitude; bounded on the south by the Australian Station, which took in eastern New Guinea and the Mandated islands adjacent, except those further east which were assigned to New Zealand.
>
> "*Africa.*" West and south coasts of Africa from the Gibraltar Strait round to the meridian of Durban, as far west as mid-Atlantic, where it touched the America Station.

In addition there were the Australian Station, the responsibility of the Royal Australian Navy, and the New Zealand Station, under the control of the New Zealand Naval Board, which have been briefly indicated above. These two latter, it may be noted, were "Home Stations" for their respective Navies, comparable to the British Home Station which comprised, not only the Home Fleet, of substantial strength, but also various local Flotillas, and all the Navy's instructional and training establishments.

The ships forming the fleets or squadrons allotted to a station, home or abroad, were naturally changed from time to time; and the larger the Squadron, the more frequent were the changes—though on the other hand, the smaller the squadron, the greater the proportion of change that the replacement of one ship by another, strange to the station, constituted. But, perhaps with the object of minimising the changes, it was customary for ships to spend the whole of a commission on one station. The term of foreign service, therefore, to which officers and men were normally liable was the normal length of a ship's commission.

For the benefit of readers who are not familiar with naval organisation, it may be explained that a ship's company does not form a permanent organisation, like that of a regiment in the Army or a Squadron of the Royal Air Force. A ship of the Royal Navy is said to be "commissioned" when her complement of officers and men join when she first comes into service; and after a term of service with the active fleet, she is "paid off", all her officers and men being dispersed to other duties. When next put into service,—which may be at once or after an interval, according to circumstances explained below—she is again "commissioned" for a similar period.

This procedure had its roots in the old system under which there was no continuous service for ratings, for long after a permanent list of officers was established. The men of the lower deck engaged voluntarily for service in a particular ship, choosing one whose officers had a good name—I ignore for the moment the products of the "Press Gang," whose conditions were different—, and were "paid off" when the ship was no longer required for service, or perhaps was unfit for it without prolonged repairs. When men were "paid off", they were no longer a part of the Navy, or subject to its authority, but were discharged to the shore and were, for the time being, free from any obligation to serve further. But when the manning situation was such that the Navy was in urgent need of more men —a chronic state of affairs whenever the country was at war, or war threatened, throughout the 18th century and up to the end of the Napoleonic wars—any seaman was by law liable to "impressment" and compulsory service in some ship-of-war without his having any say which ship it should be. "Prime seamen" therefore, after a spell ashore when they had been paid off, generally rejoined voluntarily as soon as they could find a ship which seemed to them not unattractive.

When in the middle of the 19th century a permanent service for seamen was eventually established—proposals to that end, in various forms, had been urged by several clear-sighted officers from time to time during the previous 100 years or so—the system of "commissioning" ships for a limited period was retained, the difference being that when a ship was paid off, her men were discharged to a naval depot instead of to the shore, and kept in pay, serving there until drafted to another ship. There were very good reasons for retaining this procedure, which had a number of practical advantages and was, indeed, to some extent unavoidable. There was no possibility, for instance, of making a ship and her company a permanent organisation, thus establishing the analogue of the Army's regimental system, because the ship herself is not a permanent entity.

It is true that H.M.S. Victory—rather a special case!—was built in 1765 and is still in commission and in service (though not afloat) to this day. She is, however, and was, in a special category for sentimental reasons; but she had a sea-going career of 50 years, and many of her contemporaries could have paralleled that. Moreover, it would have been possible, of course, for such a ship, when scrapped because she would hold together no longer, to be replaced by a new ship which would take on her company and her traditions as well as her name. But still there were very good reasons against the adoption of that system, or anything resembling it closely, for the naval service.

The first—a severely practical objection though not the most important—was a material one, of which a mention has already been made. After a period of active service, particularly in war time, a warship needs more or less extensive repairs and refitting and—in the case of a modern ship of which the technical equipment is highly complex—a substantial measure of reconstruction. While that is in progress, not only is it impossible to accommodate her ship's company on board her, but it would be wasting their time and their special qualifications to do so. There can be little or no useful work for them to do, for it is their function to work and fight a ship at sea, not to do the wholly different, though equally highly specialised, work of the shipwright or shipbuilder. That characteristic of a ship would alone make the permanent commission an impossibility.

Even if it did not, however, there are even more cogent arguments against its adoption, deriving from human rather than material considerations. If a ship and her company were a permanent unit in the naval service, her officers and men would pass the whole of their Service lives in one ship. There are, however, great practical differences in the conditions of life and work in different sizes and classes of ships, and consequently in the actual duties required of those serving in them. The ships themselves range from fast coastal craft of less than 100 feet in length to immense ships like the battleship H.M.S. Vanguard or the aircraft carrier—not yet quite completed as these words are being written—H.M.S. Ark Royal; from midget submarines to the small patrol craft built to hunt them in inshore waters, from ocean-going submarines to the anti-submarine frigate designed for the close escort of convoys. But however much the conditions of their companies varies from one of these to another, service in any one of them calls for the seaman's eye and the seaman's legs—as every member of one of the other Services has come to realise very forcibly when occasion has arisen for him to go afloat. It is not good for a seaman, officer or man, to be qualified for one class of ship only; his value to the Navy would be greatly diminished if he were so handicapped. A seaman should be an all-round man, capable of efficient service in any class of sea-going ship—and perhaps of sea-going aircraft as well—in which he may be needed to make up her company.

An officer too, if he is to be fitted for the more responsible posts, involving staff work, either administrative or operational, and later command of forces comprising other ships besides his own, ought to have first-hand knowledge of all or most of the duties that those in various classes of ships have to discharge, if he is to avoid getting out of touch with those who are carrying out the actual work or operations that he is organising or directing. There is hardly any more fruitful cause of discontent than extra labour or discomfort arising from the orders for the work in hand being drafted by somebody without experience of the conditions in which it will actually be carried out. It appears to those who suffer it to be unnecessary and avoidable; and the fact that it has not been avoided appears to them to indicate lack of consideration in the Command for those under them. That conclusion may not be justified, but it is none the less damaging or powerful for that; and it is thus all the more important that cause for it should be avoided by ensuring that officers' service gives them variety of experience. For officers no more than for ratings is lack of that variety acceptable.

There is yet another disadvantage in the system of permanent commissions from the human point of view. When a ship is first commissioned by sending on board her the officers and ratings who are to form her company, she does not at once become an efficient fighting or operational unit—I mention the latter because, as is set forth in Chapter III, the Navy has many duties that are important to the country as a whole which it may be called on to perform in time of profound peace, as well as its supreme duty to fight in its defence. The officers and men may be for the most part unknown to one another, and the ship herself and her special characteristics may be unknown to both of them. They need a period of thorough and intensive training in order to attain the ideal of Sir Francis Drake, expressed in his sermon to his men in St. Julian's Bay, Patagonia, on August 11, 1578, "What, my masters, we be all one company." That indeed is the common experience of any team, no less within a single ship than in a squadron comprising a number of craft, a mixed naval and air force in an oceanic operation, an amphibious force comprising some of all three Services, or the forces of a Grand Alliance such as that of the N.A.T.O. Powers. In a single ship, however, the period that is known in the Navy as "working up" should last no more than a few months, at the end of which the ship and her company should have attained Drake's ideal. Thereafter she and they remain at the height of their powers for the duration of her commission.

That duration, however, is not unlimited. A ship of war is at the best very close quarters, for it is always difficult to provide space to accommodate all those needed to work her and man her armament without a measure of what the dweller on land would adjudge to be overcrowding. That feature of life afloat is, it is true, largely responsible for the atmosphere of tolerance and goodfellowship that is traditional in the sea service; but at the same time, it has its drawbacks. There is no doubt that a company, even of Drake's standard, cooped up for too long in the somewhat cramped quarters of a man-of-war, tend to become stale, and the members of it to feel the want of a change. What the duration of a commission should be is not a matter that can be exactly calculated from general principles; it can be determined only as the result of practical experience. But once it has been so determined, it has been found that at the end of it, even if the ship herself is materially fully fit for a further period of service before it is necessary to withdraw her for refit or reconstruction, it is necessary for her to be paid off to avoid deterioration of her company. In such a case, she may well be recommissioned the following day with a new company, and the same process is repeated as before.

The standard length for a commission has, as may be imagined, varied from time to time in the Royal Navy. When the writer first went to sea in a ship of the North America and West Indies Station, it was three years. Many years after that, it was nominally reduced to two years. Now, according to the First Lord's announcement in Parliament on March 9 last, it is to be retained at that period for aircraft carriers, but to be reduced for all other classes of ships to a year and a half, as soon as the necessary alterations to the system of drafting at the Depots can be brought fully into force.

It had been the common practice up to the 1st Great War at least, for ships on a foreign station to go there on commissioning and to spend the whole of their commission there before either being ordered home again, or paying off abroad and being recommissioned the next day by a new company sent out from home for that purpose. That meant that those serving in a ship on a foreign station, or the men of the lower deck, at least, who could not afford to bring their families out from England while they were abroad, were separated from their wives and children for three years at a time. Moreover, the maximum length of a foreign commission so laid down was by no means strictly observed. When the writer was serving on the Mediterranean Station at the beginning of the present century, there was more than one ship in the Mediterranean Fleet that had been over three years on the station, and one which had been over 3½ years. It is not surprising that many of their companies had a serious grievance at their fate; and it was probably the discontent that such incidents caused amongst the men of the lower deck in general that led to the official length of commissions being later reduced to 2 years.

Even that reduction, however, proved in time to be insufficient. The tendency nowadays is to demand higher and higher standards of comfort and amenity for all, and before the late war the demand began to be heard for a further reduction in the period of separation from families caused by foreign service in the Navy. But curiously enough, the only method of achieving that desirable result that was then suggested was to provide facilities for the wives and families of ratings to travel, at the public expense, to the main base of the squadrons on Foreign Stations, and to arrange accommodation for them there, so that, when the squadron was in harbour, ratings in their turn of day or night leave, could see their families at least as much as their officers did. It had been the custom for those officers who happened to be able to afford it, to bring out their families at their own expense and set up a home in Malta, Simonstown, Bombay or Hongkong. But for ratings the solution adopted was not a very effective one, partly because of its great cost, and partly because, when circumstances prevented one ship from spending as much time at the fleet's base as some other ships did—earthquakes and other emergencies which make calls upon the services of the Royal Navy in peace time are not predictable or capable of being controlled—the much-vaunted privilege proved in practice much less satisfying that the prospect held out. There might have been, however, another solution of the problem of reducing separation, which was frequently proposed and discussed unofficially in staff colleges and officers' messes, but which, curiously enough, until now seems never to have been seriously considered by authority.

The question was asked, in these discussions, why is it necessary to have permanent foreign squadrons at all? Towards the end of the 19th century—when the British Navy was the traditional symbol of the *Pax Britannica* and of the well-established British command of the seas which had been uncontested since the Napoleonic Wars—it was the practice, from time to time, to commission a "Flying Squadron" which could be sent to any quarter of the globe where trouble appeared at the moment to threaten. Why should not this system be extended and made permanent, "Flying Squadrons" visiting all foreign stations as necessary, but based at home and returning home at intervals between visits, whereby the separation of officers and men from their families would be neither excessive—as it too often was at that period—nor a severe tax on the purses of officers who could ill afford to transport their familes about the world? Probably the answer at the time was alleged to be the inadequate fuel endurance of the ships of the day, and the great cost of sending them steaming all over the globe instead of lying comfortably at their buoys in the Grand Harbour, Malta, or Grassy Bay, Bermuda. But I suspect that the suggestion was never really considered at all by authority; or if it did happen to reach the ears of a Lord of the Admiralty, it was pooh-poohed as being a crack-brained idea. It was not unusual at that period for such an one to consider and say that what was good enough for him as a boy should be good enough for a younger generation; the Navy had always had ships on foreign service, and it was a part of the scheme of things which ought to be accepted without question.

Yet a little further back, such a system, though not universal, was by no means unknown. It was the common practice to make detachments from the "Western Squadron", cruising off Brest or in The Soundings, for any part of the world in which there was a need for naval action. Lord Barham, writing to Cornwallis in 1805 illustrated this principle. "As the Western Squadron," he wrote, "is the mainspring from which all offensive operations must proceed it shall be my care to keep it as strong and effective as possible." Yet it has remained for the present Board of Admiralty to re-introduce this eminently advantageous measure to meet what has evolved into a serious defect—from the welfare point of view—in the peace-time administration of the Navy.

The First Lord gave only an outline of what the new arrangements will be. The normal length of commissions is to be reduced to 18 months, except for aircraft carriers for which it is to remain at two years—incidentally, the reasons for reducing other ships below that period are not, as will be seen, self-evident; if two years are necessary to ensure that full value to the Navy accrues from maintaining as a unit the fully efficient team that a good ship's company form when once "worked up," it is not clear why a quarter of that period should be sacrificed in the case of ships of other classes. Of this 18 months, not more than 12 are to be spent on foreign service at any one stretch; so that that in future, when the scheme is in full operation, will be the maximum period of separation from family life to which officers and men will be subject. That period, it will be generally agreed, is not excessive for men employed in a service of great activity, which inevitably takes them to many parts of the world. After all, men whose ideal is to return to their own fireside every evening of their lives are not of great value to the Navy, which needs a greater measure of the adventurous spirit in its officers and men. But neither is it fair to the men of that spirit to take advantage of their enthusiasm to call upon them, as the seamen of 50 years ago were called upon, to give up all chance of family life for years at a stretch. There is no need for that sacrifice; and it has been perpetuated for the last half-century simply, it would seem, because successive Governments and Admiralties have not recognised that the ordinary handicaps of one age may become the intolerable hardships of the next, and have not taken the trouble to alleviate them. That seeming callousness is now a thing of the past. Clearly the traditional neglect of the feelings and needs of the men of the Armed Forces, to which attention was drawn in the first chapter of this Annual for 1953, has not been allowed to prevail in this sphere of naval administration, as it unfortunately has often prevailed in the past in the matter of pay and pensions. It is, for the Services, an encouraging sign and welcome of the times.

H. G. T.

CHAPTER XXXII

ANTI-TERRORIST OPERATIONS IN MALAYA 1953/54

By Brigadier K. R. Brazier-Creagh

INTRODUCTION

The anti-terrorist operations which are in progress in Malaya are part of the cold war, which is being fought in various countries in the Far East. The outbreaks were more or less simultaneous and part of a carefully coordinated Communist plan to drive the Western Powers from the Far East. Although it is on the "shooting war" that public attention is normally focussed, it must not be forgotten that, side by side with the anti-terrorist operations in Malaya, an equally great, or greater, though less spectacular, battle is being fought for the hearts and minds of the people of the country. These two battles inevitably impinge on one another and, in this peculiar type of warfare, operations cannot be regarded as a purely military concern. All operations inevitably become affairs in which the Police and the Civil Administration are involved and have their contribution to make in addition to the soldiers.

THE ENEMY

Organisation

The enemy is the Malayan Communist Party (MCP). Their armed forces, against which the "shooting war" is being fought, are nominally divided into the Malayan Races Liberation Army (MRLA) and the armed units of the Min Yuen (or peoples movement). The MRLA is a full-time military organisation, armed and uniformed, composed almost entirely of Chinese. Some 10% Malays, or Indians form the non-Chinese element. The Min Yeun is the organisation by the MCP of the civil population to carry out ancillary duties on behalf of the MRLA. They arrange the food supplies, collect funds and recruits, provide couriers, and disseminate propaganda. They attempt to so dominate the civilian population in their area, that they carry out the instructions of the MCP.

Supply

The MRLA live in temporary camps in the jungle constructed from bamboo and attap, materials which are readily available there. They have no fixed locations and no lines of communication. They depend for their supplies of arms and ammunition on concealed stocks left over from the last war, which were considerable. Apart from those abandoned by the Imperial Forces when they withdrew in 1941, large quantities of arms and ammunition were dropped into Malaya during the rest of the war to guerilla forces operating against the Japanese, many of whom now form the leaders of the MRLA. Large quantities of these arms were never surrendered, but were concealed and brought out for use when the Emergency began. The stock is not inexhaustible and, since practically no supplies come in from outside, they rely for replacements on captures from the Security Forces. There is evidence that they are short of arms and ammunition.

For food supplies, they originally relied entirely on the civilian population, but as the Security Forces were strengthened contact with the population became more dangerous and they began to cultivate areas in the jungle, with a view to establishing a degree of self-sufficiency. Some essential items of diet cannot, however, be grown or obtained in the jungle and the necessity remains for contact with the civil population to obtain recruits, funds, clothing, and many other essentials. It is this necessity which is the "Achilles' heel" of the terrorists. It gives the Security Forces the opportunity to close with an enemy who usually seeks to avoid contact, is elusive, wary and operates in ideal guerilla country.

Recruits

It appears that it is not difficult for the MCP to obtain recruits to replace casualties in the lower ranks. The principal limitation appears to be the shortage of food and arms in the jungle. There is evidence, however, that they have little success in recruiting men of intellect and character who will make leaders. The ranking members of the MCP are all Communists of many years standing and the qualifications for promotion are strict and seldom varied. Many years of faithful service are required to gain promotion and they will rarely promote to a vacancy caused by a casualty, unless a suitably qualified candidate is available. This, coupled with their failure to recruit men of intellect, makes their command structure vulnerable.

If we can eliminate the leaders faster than they can train on substitutes who they are prepared to accept in the higher ranks, their command structure will gradually crumble, the driving force behind the rebellion will be stemmed and the rank and file will desert. This enhances the importance of any successes in eliminating ranking members of the organisation.

Their plan

Their original plan of campaign was divided into three phases. The first was pure guerilla warfare, designed to weaken the Government while they built up their strength, the second was to be intensified attacks and the occupation of small areas and, in the third phase, administrative control was to be established over abandoned areas, the guerillas would be converted into a regular army and the Government would be overthrown by armed force. Their plan has been halted in the first phase.

The present situation

The present situation is, therefore, that the enemy has an armed and uniformed force living in small groups in temporary camps in the jungle, supplied, somewhat precariously, through the Min Yuen organisation and its links with the civil population and communicating mostly by courier. The armed forces generally avoid contact with the Security Forces, except in planned actions normally directed to the capture of arms and ammunition. In addition, factories and estate lorries have been burned, trains derailed, rubber trees slashed, telephone wires cut and individuals murdered.

The initiative is largely with the enemy and it is very difficult to predict their course of action.

THE PROBLEMS OF COLD WAR

The restoration of law and order

The first problem which faced the Government in the Emergency was the restoration of law and order. The effect of the terrorist tactics was to destroy the confidence of the people in the Government's ability to protect them. Faced by a terrorist with a gun and without hope of Security Force protection, many assisted the terrorists; others did so voluntarily. The terrorists were able to obtain what they wanted from the population and the Government could not obtain what it wanted most, which was information about the terrorists, because the people feared reprisals. Information sources only began to flow once more as the Security Forces established control and confidence returned.

Under the Emergency Regulations, the Government assumed extraordinary powers, but it is most important that those powers should be used with discretion, because the restrictions can become very heavy and the discontent caused will be exploited by the opposition. Whenever security allows, therefore, restrictions should be relaxed to confirm the good intentions of the Government.

Resettlement

The next major problem was how to isolate the rural population from the terrorists in a country where they live in scattered villages and small settlements, many on the jungle fringe, or in isolated places many miles from the nearest police post. To solve this problem, the resettlement policy was adopted as part of the Briggs Plan and thousands of the population were moved into new villages, which were compact, well-planned, and provided with protection. This protection took the form of perimeter wire fencing, in some cases lighted up at night, police posts and Home Guard.

At the same time, the new villages were provided in many cases with piped water supply, electric light, schools, and medical centres; amenities which had never reached them in their scattered dwellings.

The battle for hearts and minds

In the simultaneous battle for the hearts and minds of the people, the Government had to tackle the problems of leading the people towards self-government, of developing trade unions and of improving education, housing conditions, and health.

The demand for self-determination and the development of democratic institutions exists in Malaya as elsewhere in the world outside the Iron Curtain and it is an aspiration which must be met and developed on sound lines. Although the general standard of living in Malaya is high compared with other countries in the Far East, there is a vast leeway to be made up in general conditions. Illiteracy, insanitary housing, and a starvation level of wages still exist as a fertile soil for Communism.

Finally, if the people were to be won over to loyal support of the Government, which is an essential condition to the conduct of successful anti-guerilla operations, it was necessary to drive into the minds of the people, through the Information Service, the merits of the existing Government, its achievements and its aims.

THE GENERAL SITUATION

General security

When the year 1953 opened, great progress had been made. The tide of terrorist success had been stemmed. The statistics for the past months had shown a steady increase in the number of eliminations of terrorists and a welcome diminution in the number of incidents. The type of incident was broadly the same; ambushes of Security Forces, burning of estate lorries and the murder of individuals, though attacks on European civilians were becoming rare.

There had been a marked drop in the incidents on the railway and the night train service through from Singapore had been resumed, though a train guard was and still is necessary.

The situation in the centres of population has not changed, because the terrorist had never shown any inclination to strike there. It was still necessary to go armed when moving outside municipal boundaries, but it had been possible to declare certain roads "white." On these single military vehicles could move by day without an escort.

The Home Guard

The resettlement plan was virtually complete and the Home Guard had been developed. Now in Malaya, every Chinese village and Malay kampong which could be subjected to terrorist activity has a Home Guard. They are drawn from the members of the village, armed with shot-guns and given rudimentary training, which enables them to protect their homes and families from the armed threat of terrorists. In addition to static guards on the villages, they carry out patrols in the vicinity.

The Police

The Police are organised into three main elements, the Regular Police, the Special Constabulary, and the Police Field Force.

The Regular Police man the police stations and police posts throughout the country and maintain law and order as the servants of the public. Much has been done by the Police to gain the confidence of the public through "Operation Service," whereby the Regular Police carry out their duties, wherever possible, unarmed and do everything they can to promote a feeling of friendship and mutual confidence between themselves and the civil population.

The Special Constabulary are armed and organised into approximately 800 Area Security Units. These units, each about 25 strong, are allotted to areas based on the strength of population, industry, and planting. They provide security in their areas by static guards on important points, by patrolling up to the jungle fringe, and by providing personal bodyguards to selected individuals. Their principal task is to isolate the civil population from the terrorists and so prevent money, supplies, and recruits going out to the enemy and Communist propaganda coming in.

The Police Field Force is armed and organised on a para-military basis. Until recently, they had been used to supplement Army units and fill out the framework of security. Now, their principal tasks are manning the jungle forts, which are described later, and operating against terrorists who withdraw over the Thailand border, in accordance with the Border Agreement with the Thai Government. This agreement allows the Federation Police, but not soldiers, under certain circumstances and conditions to operate across the border between the two countries.

The Army

The infantry battalions of the Army in Malaya are deployed in what is termed a framework, which covers the populated areas of the country. The objects of the framework are to support the Police in those areas, to give confidence to the people and to assist in the task of cutting the connection between the Communists and the public.

It must not be forgotten that in those operations the Army is in support of the Civil Power and will remain so as long as the war remains "Cold."

It is seldom that a battalion is concentrated in one place, except when it is withdrawn for retraining. Normally, companies are disposed in base camps at important points in the battalion area. In those operational company camps the accommodation is tentage, or temporary huts. This dispersion enables the battalion area to be adequately covered, information to be acted on quickly, and it facilitates deployment with less chance of being observed by collaborators with the enemy. Wherever the civil population are, there is always the risk that enemy observers are present.

The Cavalry Regiments provide escorts on the roads as required. In some cases, daily convoys are run with escorts provided. They also escort the higher commanders when they move by road.

There is a wide assortment of races represented in the Army in Malaya. Besides the British regiments, there are Gurkha, East African, Fijian, Malay, and Sarawak units. In addition, there is forming the Federation Regiment, which is being recruited on a multi-racial basis and includes Malays, Chinese, Indians, and Eurasians. The Sarawak Rangers are recruited from the dyaks of that country and are employed as operational platoons and as trackers attached to units. The jungle is their native element and their ability at tracking is almost uncanny.

Despite the multiplicity of creeds, customs, colours, and tongues, these units, which are mixed within brigades, cooperate extremely well. Moreover, their relations with the people of the country are excellent. The soldiers, by their good example and behaviour, their kindness and helpfulness have won much friendship from the peoples of Malaya, which has been shown in the spontaneous demonstrations of the inhabitants towards units leaving the country.

The RAF

The ground forces are supported by an Air Force of Lincoln bombers, ground attack, and transport aircraft and helicopters.

It is an unsatisfactory war for the bomber or fighter pilot. Only very exceptionally does he see his target, or the effect of his bombs, rockets, or cannon. Moreover, the problems of putting his load in the right place are greater than usual, because of the difficulties of target location in the jungle and the fact that the targets are very small. In addition, the enemy, having a healthy respect for air attack, gets out of the target area with remarkable speed, if given any indication of what is in store for him. The problems of obtaining surprise and achieving increased accuracy are being constantly studied and the results improved.

It is often months before a true assessment of the value of an air attack can be made. The real story may emerge from a terrorist, who was present at the receiving end, but who did not surrender for several months. Then, an air attack, whose value may at the time have been discounted, is shown to have been a great success. This, however, is a feature of this type of warfare and not confined to air operations. Very often, the full value of an operation is not apparent for months after it took place, and it is almost always premature to declare than an operation is a failure because it does not achieve immediate results.

Photographic reconnaissance is of very great assistance in locating camps and cultivation areas. Air photographic cover is always demanded by commanders when planning operations. It is supplemented by visual reconnaissance by Auster pilots and this has become the primary role of the Air OP Squadron. They have developed a high degree of skill in spotting camps and cultivation areas, which is no easy task when flying over a featureless expanse of primary jungle.

The transport aircraft provide the means of supplying troops in the jungle who have to penetrate and remain in for more than the few days for which they can carry supplies. The patrol makes its presence known by smoke grenade and the supplies are delivered to them by parachute drops. They also transport troops of the Special Air Service Regiment on airborne operations.

The Royal Navy

The Royal Navy patrol in coastal areas to prevent supplies reaching the terrorists from external sources. They also assist in river transport and, when opportunity offers, bombard targets in support of the land operations. An RN Squadron of helicopters is providing an invaluable source of troop lifting transport.

The Intelligence Services

By the end of 1952, the Police had been considerably strengthened and this policy had also been applied to the Special Branch. This was of particular importance, because in cold war it is upon the Special Branch that the Government has to rely for the information necessary for the conduct of the war.

The development of a Special Branch is inevitably a slow process and it was only in 1953 that the harvest sown in previous years began to be reaped. The combination of the strengthening and firm establishment of the Special Branch and the return of confidence in the people due to the Security Force successes, resulted in an increased flow of information.

The Army in this type of warfare relies largely on the Police as a source of tactical intelligence and, consequently, the Police and Army intelligence staffs were integrated. In addition, in order to allow the Special Branch to concentrate on its proper role of penetration of the enemy, a system of Military Intelligence Officers (MIOs), who work under State or Circle Special Branches, was set up. These MIOs are responsible, within the Special Branch, for collating and assessing all tactical information, which can be passed on for use by the military, or the operational police. They are more highly trained than normal battalion, or brigade intelligence officers and, because of their close connection with the Special Branch, they enjoy the confidence both of the Police and the Military and are thus of particular assistance in promoting cooperation between the two.

The Chain of Command

In order to control and direct the forces operating in the anti-terrorist operations, a special chain of command was established. This works parallel with the normal instruments of Government in the form of the Executive Council and the Legislative Council.

At the head is the Director of Operations, who sits as Chairman of the Director of Operations Committee. When General Sir Gerald Templer was High Commissioner, he combined this appointment with that of Director of Operations, but since he left, the GOC Malaya, Lieut.-General G. K. Bourne has been appointed Director of Operations. His Committee consists of his Principal Staff Officer, the heads of the Fighting Services, and the Police, the Director of Intelligence, the Secretary for Defence, and the Chief Secretary to the Government. This Committee deals with all the day-to-day problems of the Emergency.

In each State there is a State War Executive Committee (SWEC) whose Chairman is the Mentri Besar, or Prime Minister of the State who is a Malay. The members are the British Adviser, the Chief Police Officer, and the Brigadier.

Each SWEC has under it a number of District War Executive Councils (DWEC), consisting basically of the District Officer, who in many cases is a Malay, the Officer Superintending Police Circle, and the Battalion Commander. Military, Police, and civil boundaries do not always coincide and so it is sometimes necessary for a Company Commander to sit on a DWEC. The important point, however, is that at all levels the police and the Army are working with the Civil Administration.

Planning

The cooperation which is so important in intelligence is equally important in operations, and great efforts have been made to achieve an organisation which ensures cooperation over operations between, not only the Police and the Army, but the Civil Administration as well. Joint operations rooms, manned by both Police and Military, have been established at all levels and daily meetings and discussions between the heads of the three Services and their staffs take place. At these meetings, the Army intelligence staffs, working in close cooperation with the Special Branch, provide the information on which operational plans are made.

This information comes mostly from the population, or from surrendered terrorists, and is supplemented by air reconnaissance and photography which is invaluable in locating enemy cultivation areas and sometimes camps.

Based upon this information, the local plans are made and in all these plans, the triumvirate who run the Emergency—the Police, the Army, and the Civil Administration—are concerned. When air support for the operations is required, the RAF are brought into the planning.

The ambush

If the terrorist intentions, or routes are known, the most successful tactics have proved to be the silent ambush. The troops move out, usually in motor transport. There follows the approach march through the jungle and finally the stealthy move into selected individual positions. This is normally followed by prolonged hours of waiting. These hours are often spent in a cramped position, but no move must be made, no smoking, or talking. The wait may be through the damp oppressive heat of the day, or through the night, frequently in torrents of tropical rain and usually consumed by insects, but instant readiness must be preserved.

Only occasionally is patience rewarded by the arrival of terrorists and then they frequently appear from the least expected direction. Their approach is silent, wary, and suspicious, like hunted animals. They invariably move well-spaced out. Their jungle craft is excellent and, at the slightest noise, or suspicious trace, they will withdraw and the chance, so patiently awaited, is lost. The timing of the opening burst of fire, so that the maximum number of the enemy are inside the ambush, requires a cool head and quick decision in the commander, who is frequently a young second lieutenant. Moreover, if the ambush is not to be sprung prematurely, iron discipline is required of the troops taking part.

Action, when it comes, is all over in a matter of minutes, in strong contrast to the hours and often days of preparation.

Patrols

The framework strategy has never been allowed to become one of purely static defence. From their bases in the framework, patrols continually go out to search for the terrorist, his camps, cultivation areas, and dumps of food, all of which are destroyed when found.

It is a form of warfare requiring endless patience, great endurance and relentless determination, but the enervating climate tends to sap all these qualities out of a man. Occasionally, a piece of "hot" information results in a quick spectacular engagement, but this is the exception. The normal course of operations is the dogged pursuit of the enemy by small patrols of infantrymen through this thick, damp, tangled jungle for days on end.

A patrol can only carry a few days' rations with it and additional supplies cannot be sent up to it through the jungle. Except for patrols of short duration, therefore, air supply is required. Daily the RAF Valettas, with their RASC despatchers, take off to find these small patrols dotted over the vast expanse of the jungle and deliver their supplies to them by parachute with remarkable accuracy and unfailing punctuality.

(*Picture Post Library*)

MALAYA. A man has been wounded by a terrorist and his comrades blow up trees, and clear the undergrowth, so that a helicopter can land to take the man to hospital.

The jungle shown in the picture is typical of many parts of Malaya

It is possibly not realised that the Infantryman on patrol plods through the jungle on an average for hundreds of hours without seeing his enemy. When at last contact is made, it is more often than not of a fleeting nature, with only the chance of a snap shot from an awkward position before the enemy disappears once more into the tangle of undergrowth and the patrol resumes its way.

It is, therefore, hardly surprising that, before a kill is recorded, the time the average soldier has to patrol is measured in thousands of hours. Even when ambushing on information, the most fruitful source of kills, the average time the soldier has to wait before he can expect a kill is well over 100 hours.

Retraining

It is not possible to keep troops on operations of this kind indefinitely without a period for rest and retraining. To attempt to do so, would result in a fall in operational efficiency. Battalions are, therefore, withdrawn from operations from time to time and concentrated at their battalion base, which is usually in one of the bigger towns. Here they are able to rest and enjoy the amenities of civilisation, to be reunited with their families, to overhaul their administration and to carry out essential training which has not been possible on operations.

The continuous study of the operations results in new techniques and battle drills being evolved. These must be practised and, in addition, there is the continual drive to improve the accuracy of jungle shooting by range practice.

DEVELOPMENTS IN 1953/54

The problem

Towards the end of 1952, it gradually became apparent that the enemy had changed his policy. Under pressure from the Security Forces, he had been compelled to break down his organisation into smaller groups and to divert more of his energy to cultivating the jungle in order to maintain his supplies of food, since contact with the civilian population was becoming more dangerous. This also resulted in a retreat further into the jungle.

Evidence began to accumulate of cultivation areas deep in the jungle, the domination of the aboriginal tribes who live there by the terrorists and, possibly, the formation of bases.

Although to have driven a considerable proportion of terrorists away from the inhabited areas into the deep jungle could be regarded as a definite success, it posed some formidable problems for the Security Forces. Once in the deep jungle, they were less accessible, movement was desperately slow and the enemy could inform himself of every movement the Security Forces made through aborigines who were subborned to his side. At the same time, the problem of finally eliminating the terrorist from the rural areas still remained.

Policy

The policy of maintaining an overall squeeze on the terrorists by means of the framework operations and through food control had been proved sound, but, with the situation changing in favour of the Security Forces, operations of a more offensive type were called for. Experience had shown that food control was the most potent weapon in the hands of the Security Forces and, during 1953, in addition to the normal food control measures, what were termed food denial operations were developed.

Food denial operations

Within the normal framework, a food denial operation is launched at a particular area, with a view to the destruction of the terrorists in it. It is a combined civil, police, and military operation, requiring a high degree of cooperation in planning and execution.

The area is first declared a food control area into, or out of which food cannot be moved without an escort. A reduced rice ration is imposed and the civil administrative officers collect all surplus rice by house-to-house search and purchase. The sale of rice in eating houses is restricted and all tinned food is punctured at the time of purchase to preclude it being stored.

The police, reinforced, move into the villages and food supplying areas, where they carry out checks and searches of persons and vehicles moving into and out of the area.

The result of this activity is to cut down considerably, if not entirely to cut off, the supplies of food reaching the terrorist from the civil population in that area. The terrorists are unable to move to another area, as their maintenance and communications are dependent on their local contacts. Their only course is to fall back on their jungle dumps, lie low and hope that the operation will not continue more than six weeks or two months, which is usually the limit of their jungle dumps.

In order to prevent them going to ground and living on reduced rations, the Army units step up the patrolling in the area and endeavour to find and destroy the enemy food dumps.

Frequently nothing happens for six weeks to two months and it requires considerable patience and determination by all concerned to keep up the pressure. Then, as his dumps run out, the terrorist is forced to make contact with the civil population to obtain supplies and the Security Forces are waiting for him. The weaker brethren become a target for psychological warfare and surrenders and kills begin. Each surrender is a source of information and the momentum of success steadily rises.

It is this type of operation which is being carried out in all States in the more accessible areas with a view to smashing the terrorist organisations in them.

Psychological Warfare

Psychological warfare is being used with increased intensity in connection with these operations. Leaflets, posters, and broadcasting are used, but during this year a new weapon has been added in the form of the Voice Aircraft. This is an aircraft fitted with loud-speakers, which can broadcast messages while flying over an area. This aircraft and the tactical leaflets, which can be rush printed as a result of a kill or surrender and distributed by air or ground forces, are the principal means of attack.

The Helicopter

In dealing with the terrorist in the deep jungle, the advent of the helicopter in 1953 placed a weapon of great power in the hands of the Security Forces. It increased very greatly the mobility of the troops. Distances could be covered in a matter of minutes which previously would have taken days of strenuous marching. It conferred the ability to fly over the enemy's intelligence screen and so to achieve surprise, and it enabled casualties in inaccessible places to be lifted out and rapidly conveyed to hospital.

When the helicopter first arrived it was thought that it would be necessary to give units special training in emplaning and deplaning drill. This was found to be unnecessary and a short explanatory talk before emplaning was all that was required. After a short time on operations, these helicopters, one squadron of which are manned by the Royal Navy, achieved remarkably quick turn round times in delivering one load of troops and taking off to collect the next.

The Landing Zones in the deep jungle are reconnoitred in advance by pilots of the Air OP Squadron to save helicopter flying hours. If the landing surface is rough, they do not touch down but hover, and the troops jump the last few feet or descend on scrambling nets.

Troop lifting has been the principal task of the helicopter, but in addition, they have carried out casualty evacuation, tactical reconnaissance and communication flying. The ability to move commanders quickly round an operational area, visiting isolated detachments, has proved a great asset in this form of warfare.

Deep jungle operations

The spearhead of the operations in the deep jungle has been the Special Air Service Regiment, whose special equipment and training fits them particularly well for this task. During 1953, they perfected the new technique of tree jumping, or parachuting into the thickest jungle. To the uninitiated onlooker it appears nothing short of suicidal to parachute into trees 150 feet high, but the remarkably low casualty figures show how safe it can be when properly done and it confers that precious element of mobility when pursuing the terrorist in deep jungle.

At the same time as the problem of operating against the enemy in the deep jungle was being considered, the administrative problem of the aboriginal tribes, who live there, had also to be tackled. The MCP had been in more or less constant touch with the aborigines for 12 years. They are a simple people and consequently had come very much under Communist domination. At first, attempts had been made to resettle them. This was not a success, because, moved to a new locality, or a different altitude from that to which they were accustomed, their health suffered. It was, therefore, decided to carry administration to the aboriginal tribes in conjunction with and as part of the deep jungle operations.

The plan was to establish a series of forts in the deep jungle along the central spinal range of Malaya. The location of these forts was decided after combined reconnaissance by the Police, the Army, and the Civil Administration, usually in a helicopter. The location having been fixed, the Special Air Service Regiment launched an operation into the area, established the fort, which was built of bamboo and attap by gangs of aborigines collected locally for the purpose and when it was ready, handed over to the Police, who manned it with units of the Police Field Force.

Owing to their isolated locations, these forts cannot be maintained by road and so supplies are dropped to them from the air by the RAF and the garrisons are positioned and relieved by helicopter. A dressing station, a trading post, and an elementary children's school are established at the forts for the benefit of the aborigines.

The garrisons of the forts patrol to make contact with the local tribes, obtain intelligence and try to break the aborigines' adherence to the Communists. Based on these forts, operations are carried out by other troops to clear the area of terrorists. Known terrorist camps are attacked and their cultivation areas, on which they are almost entirely dependent, are destroyed.

PROGRESS

The enemy thwarted

There is no doubt that the year 1953/54 has been one of steady progress. The MRLA has largely withdrawn from the inhabited areas of the jungle fringe and has been forced back into the deep jungle. Their sources of food from the population are being gradually closed, with the result that they are being compelled to rely to an increased extent on jungle cultivation. The attempt to establish themselves in the deep jungle is being thwarted by the jungle forts and deep jungle operations.

The surrender rate

The surrender rate, which is a fairly accurate barometer of the enemy's morale, has risen in the past year and every effort is being made to push it higher. Although much research has been carried out, it has not been possible to isolate any particular factor, or factors which lead a terrorist to surrender. It would appear that it is normally the cumulative result of pressures mental and physical over a period, caused by fear, privation, and a sense of hopelessness. These are produced by relentless harassing, food control, and psychological attack. These are all being stepped up with a view to increasing the rate of surrender.

The leaders

The leaders, of course, are unlikely to give up. They are fanatical Communists, most of them have blood on their hands and the majority are comparatively young. They have the patience of the Chinese and of Communists.

They have probably realised by now that there is no hope of achieving their plan of campaign, or even the first phase of it. An alternative course is not, however, easy to find. They are all well known and if they attempted to come out of the jungle and live in the towns, they would almost certainly be picked up. In the light of their past records, they are unlikely to risk surrender and so they are left with the alternative of hanging on, hoping that the Communist wheel of fortune in the East will eventually turn in their favour and that they will be rescued from their dilemma by external assistance. Naturally, under these circumstances, the progress of anti-Communist operations elsewhere in the Far East affects them closely. They are the root of the rebellion and must be plucked out. Every elimination in their ranks is of the greatest importance, particularly as their replacement is one of the terrorists' greatest problems.

The White Areas

There has been a continued growth of confidence among the people in the ability of the Government, not only to re-establish law and order, but also to apply the measures needed as an antidote to the cause of the rebellion. This has resulted in an increased flow of information and a greater spirit of cooperation in most areas. This spirit has been rewarded and encouraged by the declaration of certain white areas by the High Commissioner. This means that, as the terrorists have been eliminated and the population is cooperating with the Government, a number of emergency controls, which restrict the liberty of the individual, are lifted from the area. The result is a great relaxation in life for the inhabitants. The reaction is promising and the urge to get their own areas declared "white" has been communicated to other districts.

It is the High Commissioner's policy to extend the white areas as others areas become ready and it is in this extension that the pattern of the closing phase of the war will emerge. Gradually, more and more areas will be declared white, until the terrorist is driven into the deepest jungle to starve, or capitulate.

THE PRINCIPLES

The closest cooperation between the military, police, and civil elements emerges as one of the essential principles for the successful waging of anti-terrorist operations and this has reached a high degree of development in Malaya.

The importance of an efficient intelligence service and particularly a strong Special Branch can not be overrated.

Offensive operations against guerillas should be directed to cutting off their sources of supply and the normal principles of aiming at the destruction of the enemy, or obtaining his surrender apply to these, as to orthodox military operations.

It must not be forgotten, however, that a cold war cannot be won solely by military, or police action, by shooting people, or by locking them up. Success in the "shooting war" is essential to restore law and order, but ultimate victory in the cold war and a lasting solution can only be achieved, when the battle for the hearts and minds of the people has also been won.

K. R. Brazier-Creagh

CHAPTER XXXIII

AIRCRAFT DEVELOPMENT

By Group Captain G. W. Williamson

Perhaps the most striking feature of the current year has been the production of two vertical take off fighters from Convair and Lockheed respectively. Both have been designed for naval use, and preliminary descriptions refer to their being able to take off vertically from the deck of a parent vessel, without any forward run, and to alight vertically in the same way.

The illustrations reaching this country show that each has contra-rotating propellers; these provide a horse power rating of 5,500, for a gross weight of about 10,000 lbs. But though no official statement has been made as to the future engine, it is understood that this extremely novel aircraft may any time be fitted with a larger version of the present one; the same engines, Allison T40, are used in the Convair Tradewind flying boat. A series of diagrams shows that after vertical take off the aircraft turns into a horizontal position, and then becomes a fighter capable of about 650 miles per hour; the jet effect will be very small in proportion to the thrust of the propellers; and it is conceivable that take off and landing may be aided by some high power, short term rocket engine such as those made by Aerojet in U.S.A. and de Havilland in this country.

The similar aircraft announced by Lockheed has been made to the same specification; it has the same engine, the same weight and approximately the same length and span; the preliminary descriptions, or rather guesses, about the Lockheed "Tail-sitter" state that jet-assisted take off will be used.

Although the world speed record was broken no less than four times during the 12 months ending April 7, 1954, far more spectacular speeds were attained by aircraft which do not fulfil the F.A.I. conditions for a record to be confirmed; i.e. these rocket aircraft, some capable of M-2, are usually dropped from a mother aircraft at about 30,000 ft.; and so have attained high altitude without these attempts being considered as attacks on the altitude record; similarly, although very high speed may be developed in level flight from the full thrust of the rockets, speeds of very nearly 2,000 miles per hour have been attained only in the dive.

Perhaps the most striking of these all-range aircraft is the Douglas X-3 supersonic research aeroplane. Although it has been under flight test since October, 1952, it is only recently that illustrations have reached this country. Its technical features have been excellently summed up by James Hay Stevens in the "Air Pictorial" of February, 1954; in an early paragraph he points out that at present this aircraft is provided with a total thrust of only 9,000 lbs. instead of the designed 14,000 lbs. jet engine.

The wings are straight; the ratio of thickness to chord may be about 5%, and these thin wings require no sweep back to overcome the hump on the curve of drag co-efficient compared with speed; this hump is at its maximum round about the speed of sound, and is, therefore, referred to by Mr. Stevens as the "sonic drag hump." He goes on to refer to the difficulties of flying this strange aircraft:

> The slick lines of the windscreen treat the airflow well, but hardly give the pilot any view at all—particularly at the higher landing incidence. In fact the pilot is assisted in landing by radio messages from a monitoring F-86. For a take-off weight greater than a Dakota, there is about the same wing span as the Fairey Junior. Of this tiny span, over a third must be ineffective because of interference from the fuselage, although there is probably some lift from the latter itself. The take-off run is some three miles and necessitates accelerating to 200 m.p.h. or more. In flight in the thin air of the stratosphere, one imagines that a dive will be needed to accelerate because of the low thrust/weight ratio. Clean lines and the combination of tonnage and gravity will give more urge than the engines, even in a shallow dive.

Rocket motors, with very much greater power and very small endurance, might carry this aircraft to a speed of about 2,000 miles per hour; such a speed for only a few seconds is of little practical use for military aircraft; and the development of high speed fighters will depend more upon increasing engine power, with after-burning as required for take-off and other emergency.

Other high speed aircraft are under test at the Edwards Air Force base at Muroc, California; these include three of the Bell rocket planes, X-1, X-2, and X-5; the missing X-4 is made by Northrop; X-3 is the Douglas aircraft referred to in previous paragraphs; in addition, Douglas D558-1 and D558-2 are also under test. Towards the end of 1953 a modified Bell X-1 exceeded the 1,650 miles per hour flown by Major Charles Yeager; with characteristic understatement, Yeager says "It was rather a rough flight; I was quite busy with that aeroplane." The total cost of this Bell project is stated by Mr. Lawrence Bell to exceed £3,500,000.

During the year under review, a series of new high speed records ended with a maximum speed in level flight of 767 m.p.h. by the new North American Super-Sabre F-100; this high speed was a one way figure only; and the average over a 9 km. course was 755 m.p.h. Comparing American and British records, aviation writers made the point that the difference in temperature between Muroc, or Salton Sea, and a wet day in England might account for as much as 25 m.p.h.

Writing in "Air Pictorial" of October, 1953, Sir Sydney Camm, C.B.E., F.R.Ae.S., Chief Designer of Hawker Aircraft Limited, sums up problems of variation of speed with temperature, in the following authoritative pronouncement:

> In assessing the various attempts on records, it is well to bear in mind that these days we have to relate the speed of an aircraft to the speed of sound in air, since as everybody now knows, the resistance of an aircraft increases greatly as the speed of sound is approached. The actual speed expressed as a percentage of the speed of sound (Mach number) is a measure of the efficiency of the aero-dynamic design of an aircraft. It is not generally understood, however, that the speed of sound in air is dependent on temperature and since, to all intents and purposes, the top speed of a given aircraft in terms of Mach number is constant, the top speed measured in ordinary miles per hour units will vary with air temperature. Now the speed of sound increases with increase of air temperature at the rate of 7 m.p.h. per 10 deg. F.
>
> Take the Hunter record as an example. This was achieved at an air temperature of 74 deg. F., and if the prevailing temperature had been say 105 deg. F., which is not abnormal in America and other parts of the world, the speed could have been 21 m.p.h. faster. Actually, not quite all this gain

> would be realised, because there would be an inevitable reduction in engine power at the higher air temperature, but it may be assumed that the Hunter is capable of around 745 m.p.h. under suitable conditions. It is of interest to note that on the first attempt made by the Hunter when 722 m.p.h. was recorded, the air temperature was only 65 dg. F.
>
> The difference in speed on the individual runs is accounted for by the fairly strong wind component. No actual wind measurements could be made on the course, but the aircraft speed measurements indicate wind components of 13 and 11 m.p.h., for the first and second flights respectively.

Nearly two years ago an article by Denis Desoutter in "Aviation Age" for July, 1952, summed up the various research trends in regard to wing shapes and movement. The changes then forecast included references to the Bell X-5 wings with variable sweep in flight; and went on to describe the Blackburn & General optional delta aircraft, which would have straight wings for take off; this is the proposal of Professor Geoffrey Hill, "who long has been known for advanced thinking;" on this design there are pivoted wing-tip controllers, recently seen in flight on the graceful Short Sherpa. An all-moving wing tip is indeed "as old as the Hills;" at an Exhibition at Olympia, more than 40 years ago, the schoolboy brothers Geoffrey and Roderick Hill exhibited a model aircraft with all-moving wing tips, illustrated in Volume 3 of "Flight" for 1911.

Important results are expected from the trials of the Short Brothers' S.B.5, which has wings which can be swept back to an angle of 69 degrees, by adjustments made on the ground; the tail may be above or below the fuselage; and a long series of tests are being made to determine the behaviour of supersonic planforms at low speeds, such as those for landing and take off.

Other wing shapes well proved over years of flying include the Republic XF-91 Thunderceptor, which not only has wings with variable incidence, but, in order to provide good characteristics with slow landing speeds, these variable incidence wings have a chord longer at the wing tip that at the root.

A. V. Roe & Company Limited have designed a light fighter-bomber of delta planform, as an entry for the NATO design competition. Like the Avro 707 series, the new fighter-bomber will have no horizontal tailplane. It can land without trouble on a minimum NATO P.S.P. runway, and can take off in half the minimum requirement as regards distance; and it is better as regards range and speed. Other entrants in this class are the Folland Gnat and the S.E.5000 Barodeur.

Prone-piloting experience has been obtained by pilots on the Reid & Sigrist RS-4. In February, 1954, an experimental Meteor Mark VIII was flown with *conventional* controls; but this aircraft is provided with a prone-pilot position in the nose.

In "Flight" of February 26, 1954, there was a report of a Lecture by Mr. George A. Lemke, a designer for Convair, outlining the cooling systems generally used in America's sonic aircraft. The article deals in particular with the cooling of the Douglas X-3, the Flying Stiletto. The cooling equipment has been designed by Fairchild, and is said to be capable of cooling 24 four-roomed houses in an outside temperature of 100 deg. F.

> Such a system has had to be provided for the X-3 because it is planned to maintain speeds ranging from Mach 2·5 to 3 for comparatively long periods. At Mach 2, for example, the skin friction will raise an ambient temperature

> **of 67 deg. F. to about 320 deg. F.; and at Mach 2·5 temperature would reach 486 deg. F. The cooling system is required to provide not only cockpit cooling, but also temperature control for the 1,200 lb. of electronic equipment carried in the aircraft, and for such parts and materials as are unable to withstand the temperatures expected at the X-3's design speed; among these are tyres and other rubber components, hydraulic seals and hydraulic fluid.**

In "Aviation Age" of September, 1952, the same subject was discussed by Mr. M. A. Sulkin, Chief Thermo-Dynamicist for North American Aviation; for an aircraft flying at 1,000 m.p.h., the maximum theoretical rise in temperature would be 180°F., superimposed upon an air temperature in Summer in California of more than 100°F.; in flights made by Major Yeager at Mach 2·5, the pilot noticed that the aircraft "got a little hot" from skin friction even though the outside air temperature was minus 70°F.

With a 250° boundary layer temperature, the strength of an aluminium structure would be reduced by 20 per cent; the strength reduction with titanium would be 14 per cent, but with stainless steel only 2 per cent. The Lecture refers to the difficulty of keeping the pilot cool as speeds increase; and the proposal is made that tanks of liquid oxygen and liquid nitrogen could be stored in the aircraft, evaporated as required to form a breathable mixture at a comfortable temperature level.

Cooling equipment is designed and made by Hamilton Standard in U.S.A., and by de Havilland in this country.

MEANS OF PROPULSION

1953 was the vintage year of engine development, witnessing the production of three great engines, the Rolls Royce Conway, the Bristol Olympus, and the de Havilland Gyron. In regard to these engines, we have, at the time of writing, no more information than a year ago. Olympus will be installed in the Avro Vulcan four-engined delta bomber, and it is also being manufactured under licence by the Wright Aeronautical Corporation of U.S.A., where its classification is J.67.

Gyron, or rather, Gyrone, was the name given to their engine by the team of young men responsible for the creation of the first jet engine to fly, and the design of the Gloster Meteor in which it was installed; they applied the ribald term "up-and-down" to reciprocating engines which, in their mature opinion, were becoming slightly dated. Gyron is a large axial-flow jet engine, stated to have a maximum thrust greater than that of any other known turbine. It was originally developed as a private venture; but a Ministry of Supply Contract has now been placed.

Up to the present, no statement has been made in regard to the aircraft in which the new de Havilland jet engine will be used; but it is fair to assume that it will find its best and earliest application in some development of the Comet series, within the next two or three years.

It has been stated that Rolls Conway will be used for the Vickers airliners, based upon their atom-bomber "Valiant."

So, with the exception of the de Havilland Gyron, with a possible thrust of between 15,000 and 20,000 lbs., there is no change in the list of engines shown in Table VIII. The largest known engines in order of size are de Havilland Gyron, Rolls Conway, Bristol Olympus, Pratt & Whitney

J.57, and Allison J.71; as J.67, Wright manufacture the British Olympus; they are also manufacturers of the Armstrong Sapphire.

In most of these engines, there has been little increase in thrust output; and practically all modern jet engines of more than 5,000 lbs. thrust have a power/weight ratio of 5 h.p. to the pound; on account of their simpler construction, the centrifugal compressor engines are the lightest; the Pratt & Whitney J.48, corresponding to the Rolls Tay, is stated to weigh 2,000 lbs. for 6,500 lbs. thrust, and this engine and its British prototype will therefore give no less than 6 h.p. for every pound, at a speed of 650 m.p.h. As stated in previous volumes, the conversion from thrust to h.p. is calculated on the basis that at 375 m.p.h. one pound of thrust equals 1 h.p.

During the year, designers and constructors have continued to argue about the virtues and vices of augmentation, or reheat, or afterburning; and more than one authoritative voice has assured us that there is no way of getting out of it. The figures show that the alternative is a larger engine, able to give the increased power continuously if necessary, and therefore run for most of its time at low efficiency; whereas afterburning, if used for example during climb, provides the increased power to shorten the time of climb, to a particular height, by such an amount that the fuel used is exactly the same as if afterburning had *not* been used. That is, the expenditure of fuel required to reach any particular altitude is no more with reheat than without it.

In a discussion of the increasing power of large jet engines, the opinion was expressed, on page 374 of Brassey of 1953, that North American Sabre might yet break the world's record again, if provided with some powerful engine such as the Avro Orenda. It was then suggested that Orenda might break the record by at least 10 miles, making a total of 710; however, the engine used for the record-breaking Super-Sabre was the Pratt and Whitney J.57, with a thrust of 15,000 lbs. with reheat, as compared with the 6,500 lbs. of Avro-Canada's Orenda. For years it has been pointed out that the success of Sabre might be as much due to clean lines as to an excess of engine power over the next nearest competitor. All those aircraft which broke the world's speed record in quick succession were underpowered by comparison with some of the enormous new engines, up to Super-Sabre with the 10,000 lb. thrust of their J.57. Thus the Sabre which established a world's speed record of 671 m.p.h. in 1948 had a General Electric engine of only 4,000 lbs. thrust; the Hawker Hunter was fitted with a Sapphire of nearly twice the thrust, 8,300 lbs.; the Vickers Swift which flew in North Africa to break the record again had 7,000 lbs. thrust, augmented by afterburning; the Douglas Skyray had a J.73 made by General Electric, with 9.200 lbs., once again assisted by afterburning.

All the new large engines are of the axial-flow type; the air enters the intake of the leading edge with a certain amount of ram-effect, and entering the first stage of a series of turbine blades it is correspondingly compressed as it passes from stage to stage in a direction parallel to the axis of the shaft; in the centrifugal compressor, the entering air arrives close to the central point of the disc-like compressor, and is flung outwards radially, being compressed by this process owing to its great increase in speed, combined with the restricted space. The more powerful a centrifugal engine, the larger its diameter; the more powerful an axial-compressor engine, the longer its axis. Its disadvantage is the large number of blades compared to the centrifugal type, and its greater weight and cost; but its efficiency is considerably higher, combined with reduced fuel consumption as the number of compression stages increases. The design of de Havilland Gyron has not been revealed, though it seems possible that this may be a by-pass engine, in which a proportion of the entering air is diverted so as to by-pass the compressor; and this unheated air can then be injected into the jet pipe to increase the volume of the escaping jet, and increase therefore the power of the jet, without an increase in temperature. These two advantages—economy of fuel both by axial-compression and increase of jet-exhaust volume by means of the added air—will result in by-pass engines becoming the standard type for long range aircraft such as bombers or airliners.

The Russian Mig aircraft, so successful in Korea until the Sabre squadrons arrived, was powered by a copy of the Rolls-Royce Derwents sold to Russia by the Government of that day; since then, the Russians have scaled up this excellent design until it corresponds fairly closely to Rolls Royce Tay or the Pratt & Whitney J.48. Captured samples of this scaled up engine are stated to be of excellent workmanship. Although there are reports of the existence of experimental engines of the axial type, produced by Russian factories, there is no confirmation; and on account of the difficulties of design and manufacture of the axial type, it seems likely that U.S.S.R. may go for quantity rather than quality, as with the extremely fast Mig 15 and later Marks. Prior to their windfall in the shape of the Nenes and Derwents, the U.S.S.R. engineers were trying experiments on German axial engines of very poor design and manufacture, parts of which were brought to this country by Sir Roy Fedden immediately after the war.

The axial compressors, especially those of the two-spool type with high and low pressure stages, will be increasingly used on account of their fuel economy. It is true that the fuel consumption stated per pound of static thrust (when there is no h.p. at all) is considerable; it is expressed in pounds per pound of static thrust per hour. This provides the amount of fuel used in an hour whatever the speed; some jets, for example, use one pound in an hour for each pound of thrust; but in that hour the aircraft may fly 375 miles or 750 miles, and in the latter speed the fuel consumption per mile will be half that at the slower speed.

The "Aeroplane" of March 12, 1954, had a series of articles dealing with the different components of gas turbines; and including a Table showing all the turbine engines of the world. It is noticeable that in those made in the United Kingdom there is not a single engine for which five-figure static thrust is claimed; the nearest is Rolls Avon R.A.14, stated at 9,500 lbs. static, or Bristol Olympus at 9,750. Of course, American engine makers may be overcalling their hand, or there has been a sudden production of enormous engines possibly developed in secret. For example, General Electric J.53 is stated at 17,000 and J.73—G.E.-5 at 12,000; an unnumbered engine follows, stated at 24,000 lbs. thrust. Similarly, Pratt have a J.75 turbine, believed to be under development, with a static thrust of 15,000 lbs. Wright J.59 is stated at 12,000, and J.67, the Bristol Olympus made under licence at approximately 15,000, 50% more than Bristol claim for the same engine.

Many new small jets have been developed. Those of Turboméca are made in U.K. by Blackburn and General. These light jets have been applied to the Short Sherpa in this country, and to various converted sail-planes in France. The range includes Pimene of 242 pounds, Palas of 352 pounds, Marbore of 660 pounds and a larger version of 836 pounds.

Turboméca make the only other by-pass engine in existence as far as we know; this is Aspin, with a thrust of 440 pounds; and a larger version capable of 792 pounds. Each of these small engines has a ducted fan following the air intake to drive the air through an annular casing to the tail pipe, where it mixes with the exhaust products; the compressor is only a single stage, and the turbine two stages. The single stage compressor is of the centrifugal type, with a single-sided impeller.

Another interesting small engine is the Fairchild YJ-44, an expendable jet engine of 1,000 pounds thrust intended for target drones or guided missiles. It is used in the Ryan Firebee and other guided missiles, and may be applied also as auxiliary take off power.

Since the days of the flying bomb, the German V1 pilotless aircraft, we have become accustomed to various applications of similar simple engines, all included in the term "athodyd," derived from the words "aerial thermodynamic duct." The simplest "athodyd" is the ram jet in which the combustible mixture is compressed by forward speed alone, and combustion is continuous; the German V1 was a pulse-jet, and the propulsive explosions in the tube sounded like a very large slow running motor cycle; the "pulse" was due to a flap-valve controlling the intake of air. Both types of "athodyd" are very expensive in fuel, and both have the disadvantage that they must be propelled at a considerable speed before the tubular engine will begin to function.

Two ram jet aircraft have been flown: one of them is the Leduc O.10, in 1949 carried to 10,000 feet by a bomber, and there released; it flew for 12 minutes; and reached a speed of over 500 m.p.h. in a later flight. In 1951, another model was fitted in addition with two Turboméca Pimene jets, previously referred to; these small engines will not provide sufficient power to make an unaided take off, but are intended to serve as stand by power units for use in the air or on land.

Under construction, Leduc has a ram jet fighter, 30% larger than O.10. Artists impressions in "Air Pictorial" show that Leduc O.21 carries at each wing tip a small turbojet, Turboméca Marbore 11, with 840 pounds static thrust. These will enable the fighter to take off under its own power and achieve a speed at which the ram jet can be lighted. The designer believes that in later developments speeds of over 2,000 m.p.h. may be attained, anything higher being limited by the very high skin temperatures resulting from the friction of the air upon the surface of fuselage and wings.

To some of us, the other flight test of a ram jet is more important, since it was applied to a Meteor N.F.11 belonging to the French Air Force. The Meteor was fitted with two ram jets under the wings, each delivering half a ton of thrust, necessitating stiffening of the wings.

The most important feature of these tests is the extremely bad fuel consumption; thus, at 620 m.p.h., with 1,100 pounds thrust, each ram jet would be using 800 gallons of fuel, or nearly three tons per hour.

One other engine development may be mentioned: the use of a gas turbine as an engine starter for jet aircraft; this small engine is made by Plessey Company, manufacturers of starters of various types for many years. Two starters have been developed, of 70 and 150 h.p. respectively; but peak output of the larger one may reach 400 h.p. Sir Frank Whittle in a Clayton Lecture to the Institute of Mechanical Engineers said that he used a 7 h.p. Austin engine to turn over his first gas turbine; the little engine was itself started by the usual electric motor of about 1 h.p. One day the gas turbine took rather longer than usual to start, although it eventually got up to speed; it was later found that the Austin engine was not firing, as the ignition had not been switched on.

The new type of starter has one advantage, for gas turbines, over timed-cycle electric starters or cordite starters with a fixed energy output: that is, the liquid fuel starter will continue to turn the main engine until it actually lights up, and reaches a predetermined speed equivalent to 12,000 r.p.m. on the starter output shaft.

JET FIGHTERS

Several light fighters are in hand, beginning with the Folland Gnat more than a year ago; though not shown in Janes' "All the Worlds Aircraft" American sources refer to an aircraft styled Midge, with one Viper engine of 1,900 lbs. thrust; and weighing 5,000 lbs. gross. A larger engine would make the Gnat a formidable competitor for world records, if its lines correspond to those of the great aircraft which have already held it. Other potential light weight aircraft are being built by Douglas, Grumman, Northrop, Chance Vought, and, according to American reports, English Electric. The latter statement appeared more than a year ago; and is still accompanied by unconfirmed reports that the new light-weight fighter may be based upon one of the new designs of Short Brothers and Harland.

The last year has witnessed also a great increase in the number of delta types, several of which are well known to us; taking the British ones first, delta aircraft, research or otherwise, are being produced by Avro, Boulton Paul, Fairey, Gloster, and Short Brothers—their Sherpa is a near-delta; other delta fighters include Convair Sea Dart, and their research aircraft for the projected Supersonic fighter now being built as XF.102; Douglas Skyray, Chance Vought Cutlass, the Northrop X-4 Bantam, and the Swedish Saab-210 Draken. A 20-ton delta fighter is understood to be in hand at Avro-Canada, with two immense engines, styled Waconda, of 15,000 lbs. thrust; the gross weight is estimated at 40,000 lbs., and this would give a thrust-weight ratio of 0·75, with a performance at least equivalent to that of any fighter in the world. Two deltas are under development in France, one by Dassault, and one by SFECMAS; gross weight of the latter is stated as 9,000 lbs.; the thrust of the proposed engine (Atar 101G) is presumably more than that of 101F, which with afterburner develops a take-off thrust of 8,360 lbs. Supposing that this is so, a delta such as this, with more than 1 lb. of thrust for every pound of aircraft, would be able to climb vertically; and could be equipped for vertical take-off.

As shown by successive world speed records, 1953–54 witnessed a general increase in power and speed. There are so many fighters shown as exceeding 700 miles per hour that it may suffice to name only those which approach the existing World's Speed Record: they are the Convair F102A Delta, with 740, the Sea Dart XF2Y-2, with a very large engine, stated to achieve 800 miles per hour dry, and 1,060 miles per hour augmented; and XF4D-2 Douglas Sky Ray, with 760 miles per hour dry, likely to be increased by at least 25 miles per hour with afterburning on the fully developed engine. Some British engines of which we know are greater in power than those of the U.S.A.; our airframes are much lighter than theirs in comparison with engine thrust; and no one could ask for cleaner lines than those of recent British fighters, which will always be, to the eye of the engineer, the most beautiful in the world. But it may be as much as a year before the record returns to this country; and, as stated previously, it might be as well if British attempts were made in temperatures corresponding to those of Salton Sea or Muroc; the latter name, reversed, commemorates two Corum brothers who settled there a hundred years ago.

In a world where so many designers are changing over to delta plan forms for high speed fighters, two of them have pointed out that this may not long remain the best shape for aircraft intended to fly at Mach numbers exceeding unity. One of them is Mr. David Keith-Lucas, B.A., M.I.Mech.E., F.R.Ae.S., Chief Designer of Short Brothers & Harland Ltd. In his British Association lecture of 1952, reprinted by his firm, he provides on page 33 of "The Shape of Wings to Come" a diagram showing the fall of the drag coefficient with increasing Mach numbers; the curve of this decrease for straight winged aircraft falls rather more rapidly than any of those for aircraft with swept wings, once the speed of sound has been passed. The other critic is Mr. Clarence L. Johnson, Chief Engineer of the Lockheed Aircraft Corporation, who spoke in Los Angeles at the S.A.E. National Aeronautical Meeting in 1954. A report in Flight of January 1 confirms the figures of Mr. Keith-Lucas by making a comparison of the drag per cent of a 5% thick wing and a 3% thinner wing; approximately the same at unity, the drag percentage of the thick wing at Mach 1·2 is 200% for the thinner wing, and 350% for the thicker wing, thereafter increasing on parallel lines proportionately to the Mach number. We must not forget that one British and one American aircraft give resounding service with straight wings; Avro-Canada CF.100 exceeded Mach 1 in a dive from 30,000 ft. in December, 1952, being the first straight-wing combat aircraft to exceed the speed of sound; and the Northrop Scorpion has straight thin wings, with a stated maximum speed of more than 670 miles per hour. That is, these wings are thin, with a thickness ratio of 7½%, in comparison to modern delta fighters. The matter is of importance to Lockheed, as their supersonic fighter F104 will have straight wings; on the other hand, Republic F105 is a large fighter bomber, with a thin delta wing.

During the year, there has been an increase in the number of types of aircraft equipped for refuelling in flight. This has been accompanied by many long flights, including a crossing of the sea between Japan and Thailand, 2,475 miles, successfully accomplished by four U.S.A.F. Lockheed F.84 Thunder Jets, refuelled once at 20,000 ft. by Boeing B.17 bombers. The Boeing method of refuelling comprises a telescopic boom with control vanes, enabling the booms to be moved in any direction, by hydraulic power. Some Boeing aircraft use the Flight Refuelling

Company's equipment, in which the probe of the fighter is directed into the drogue of the bomber, as with the flight above referred to. In the system generally adopted by Boeings, the boom of the tanker is plunged into the receiver of the fighter.

There are not many additions to Tables I and II, despite the considerable increase in speeds during the last twelve months. Some types of large or all-weather aircraft have developed still further, at least to the point at which some additional details have been released. For example, the Avro-Canada CF-100 Mark 4 two-seater all-weather fighter replaced Mark 3 in production in the middle of 1953; it has all-rocket armament carried in a retractable pack in the underside of fuselage, and in wing tip containers. American sources declare that the latest Orenda 9 engine has 7,300 lbs. thrust, and gives a probable speed of 640 miles per hour for this weighty aircraft. In addition, from the same firm, a delta aircraft is referred to, CF-105, with two Waconda engines of estimated 15,000 lbs. thrust each.

The Gloster Javelin is an all-weather fighter, the first twin engine delta to be made. As it is an all-weather fighter it has been specially designed to provide good view forward and downwards; and the very wide track tricycle undercarriage provides great stability during the take off and landing. Javelin has two Armstrong Siddeley Sapphire engines, the axial flow engine of 8,300 lbs. thrust; this is the engine which established a world record time-to-altitude climb of 39,370 ft. from a standing start in three minutes seven seconds, an average vertical speed of nearly 150 miles per hour; the estimated speed for Javelin is about 700.

In Jane's "All the World's Aircraft" there are no details of Swift performance; from other sources, speeds of 700 miles per hour dry and 737 augmented have been mentioned; since then, a Swift has broken the world's record with a speed of 737 m.p.h., and this record in turn was broken by the Douglas Skyray. It has been announced that the Swift exceeded the speed of sound on several occasions.

Supermarine 508 is the most powerful fighter ever designed for Aircraft Carrier operations; it has two Rolls Royce Avon engines, and a span of 41 ft.; since this aircraft was included in last year's Table I American aviation journals have roughly estimated the gross weight at 20,000 lbs., which enables a thrust weight ratio to be calculated.

Not very much has been revealed about de Havilland DH110, a two seater day and night all-weather fighter for the Royal Navy; it is powered by two Rolls Royce Avon engines; and it has been estimated that it is capable of 730 miles per hour.

The Chance Vought Cutlass is a swept wing, tailess, single seat twin-jet aircraft for the U.S. Navy; the latest Mark is F7U-3, with two Westinghouse J40 turbines; there is another version of this aircraft for ground support; the fuselage is heavily armoured and the armament includes bombs and automatically-fired rockets.

The Douglas Skyknight is a two seater carrier-based all-weather fighter, under engined by British standards; special arrangements have been made to permit of the removal of the engines in a single hour; the crew sit side by side, with an armoured wind screen and canopy. The emergency exit is from the underside of the fuselage; but as this is a carrier based aircraft, an additional hatch is provided in the roof for escape in the event of the aircraft being ditched.

The McDonnell Voodoo is a swept wing twin-jet fighter intended for long range escort; from American information, the latest version would appear to have two Allison J.57 engines of about 10,000 lbs. thrust each; even these large engines do not provide a thrust-weight ratio much higher than the average, a total of 20,000 lbs. thrust for a gross weight of 40,000 lbs., a thrust weight-ratio of 0·5.

The fastest fighter in existence at the time of writing is undoubtedly the North American Super-Sabre, F.100. This aircraft is one of the largest single seat fighters ever built, with a gross weight of nearly 30,000 lbs. Its engine is the Pratt and Whitney J.57 split-compressor turbojet, with approximately 10,000 lbs. of static thrust at sea level. F.100 is provided with a Pratt afterburner which adds an estimated 5,000 lbs. to basic engine power for short intervals; but it may here be repeated that in a climb with afterburner in full operation, the reduction in time to height more than makes up for the additional petrol consumed in augmentation. The wings of this new aircraft are swept at 45°, as compared with 35° on other types of Sabre; they are extremely thin, and practically all the fuel is carried in the massive fuselage.

The nose intake is very wide, being of a shallow elliptical form; the pitot head is carried in front of the intake, where it forms its shock wave in undisturbed air. In view of a high landing speed, F.100 is fitted with a huge flat plate, hinged under the wing leading edge, to act as an air brake; it extends to an angle of 60° to the horizontal; when used on landings, it is supplemented by a tail parachute of ribbon type. The inside of the aircraft is largly formed from landing-gear, doors and airbrake, so that nothing could be slung beneath the body. Much of the structure is of titanium alloy; the large tail pipe emphasises the great power of the engine. This fine aircraft is in full production.

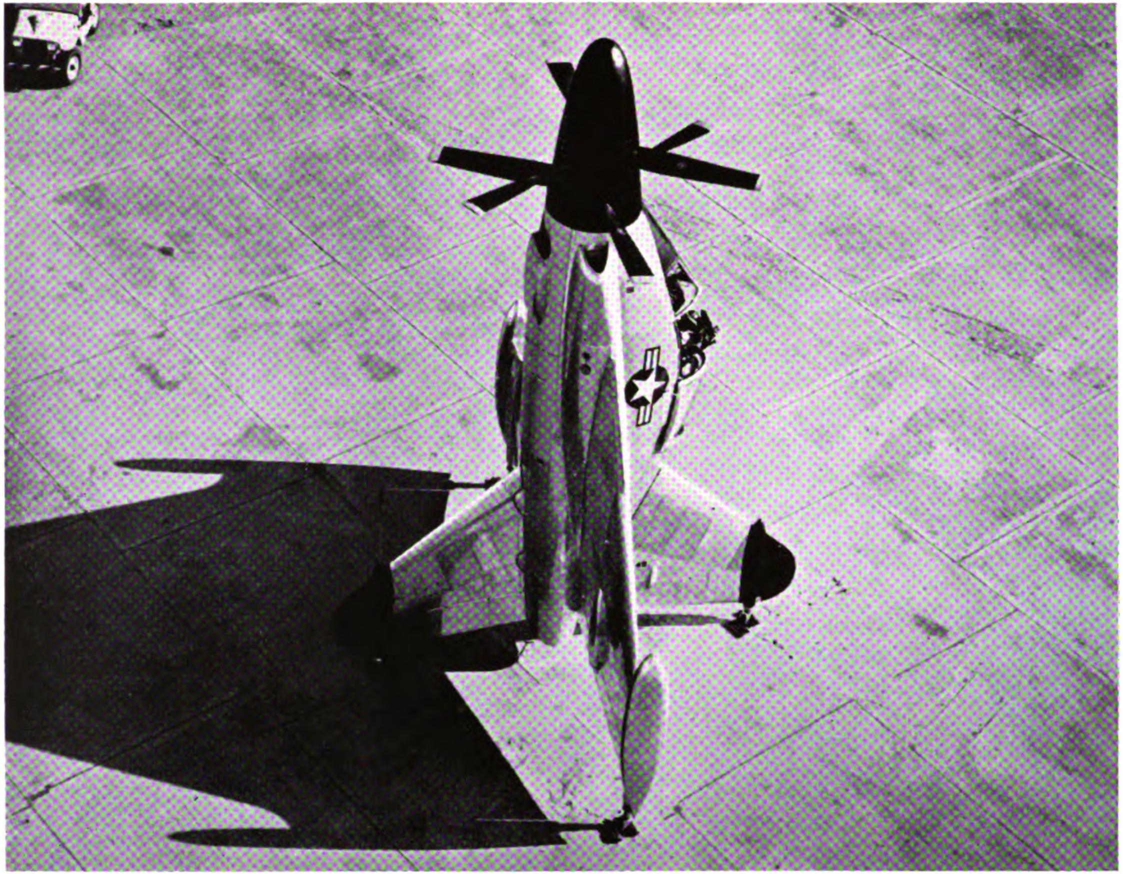
Dassult Mystere, shown last year in Table II, has been fitted with a Rolls Royce Avon RA7R, with a thrust rating of about 7,500 lbs.; for a maximum weight of 15,000 lbs., nearly a ton lighter than earlier models, this provides a thrust-weight ratio capable of giving the latest Mark about 740 miles per hour augmented.

Now that both the United Kingdom and the U.S.A. have had the opportunity of making a careful examination of MIG fighters, one in Korea and one in Denmark, the information shows this aircraft to be even lighter than was originally estimated. Table II has been brought up to date with the figures now accurately known; the wing span is only 33 ft.; the latest Mark, also with an imitation Rolls Royce engine, is lighter than the original model, having a gross weight of approximately 11,000 lbs.

The Saab Lance has not changed in the last year; it is powered by an undisclosed version of Rolls Royce Avon, and carries comprehensive electronic equipment for navigation and attack in all kinds of weather and at night.

MILITARY TRANSPORTS

The most interesting feature of military transport, on both sides of the Atlantic, has been the trend towards projects consisting of modified versions of high speed bombers, now in the design stage of long distance passenger transport, military or otherwise. For example, beginning with the first



Consolidated Vultee XFY-1, vertical take-off delta-wing fighter

to be announced, Vickers 1000 has been ordered as a military transport prototype, and a civil airliner version is projected. The general appearance, as shown in an artist's impression, is very similar to that of Valiant. The engines would be four Rolls-Royce Conway by-pass turbojets. The civil version might accommodate something between 100 and 150 passengers.

The corresponding project to be made by Avro is styled "Atlantic." It will have a long slender fuselage, equipped for various types of passenger traffic, with a minimum of 76 First Class to a maximum of 131 Tourist Class passengers; like some American transports, the seats in both versions will face the tail. Handley Page Limited have a project for a four-jet long range liner using the crescent wing of the Victor Bomber; the fuselage will be of double-bubble shape, with a maximum of 96 First Class or 150 Tourist Class passengers. Victor is powered by four Armstrong Siddeley Sapphires, and it seems possible that the same means of propulsion may be used for a corresponding type of transport or airliner.

Apart from these projects, the various types of Military transport fall naturally into three divisions:

(i) Economical aircraft with twin engines and large hulls, lightly loaded as regards the wings, and therefore suitable for operation from small landing grounds: Perhaps Blackburn & General Beverley is the best of them, and similar types in U.S.A. are made by Chase and Fairchild.

(ii) Large Military transports, usually with four engines, intended for long range high speed travel. A typical aircraft is the Handley Page Hastings Transport; Boeing have modified the world's first atom bomber, B-47, to be suitable for various transport functions; Douglas produce the Globemaster long range transport; Lockheed are supplying to the U.S. Navy their Super-Constellation in various Marks.

(iii) Large and fast Military transports intended for operation from the surface of the sea: In this country, we have the Saunders-Roe Princess; Consolidated Vultee Tradewind may carry personnel or cargo; Glenn Martin has a project in hand styled "Seamaster," a multijet high speed transport, reputed to be suitable also for mine laying.

Dealing with these transport aircraft, approximately in the order mentioned, Blackburn Beverley began with a General Aircraft design for a large four-engined freighter, and although its civil version still continues, a military transport has been ordered. The inside of the fuselage is immense, able to take a single deck motor bus or other very large vehicle with ease. This aircraft is provided with a supply dropping sighting position; and as a freighter has reinforced decks with lashing points. Modified for high density passenger or troop transport, a total of 132 passengers could be carried.

The Bristol Freighter has been developed during the last year, in the direction of larger payload and extended range; the maximum payload might be in the region of 6 tons; at a very much reduced payload, the maximum range is stated as 1,670 miles. There are several Marks; Mark 31 has nose opening doors; Mark 31E is for passenger or mixed traffic, or alternatively freight only by complete removal of the main bulkhead and all the seats; Mark 32 has a longer fuselage than the others, and this is the type supplied to Silver City Airways for the transport of cars, and 12 to 20 car-passengers.

The Chase Aircraft Company began by making gliders, and from these developed twin-engined troop-carrying transports for 30 fully armed men. One of their best known models is the Avitruc, which has been used as a cargo glider, a piston-engined transport, and a jet transport; the after end of the hull can be lowered to form a ramp for large vehicles; used for troops, 61 fully equipped men can be seated; or very nearly the same total of stretcher patients, sitting patients and six medical attendants. The side doors can be used for parachute jumps.

Fairchild make two versions of the lightly loaded twin-engined transport type: one is styled "Packplane," with a detachable cargo compartment or pod illustrated in an earlier number of Brassey; the other is the Fairchild Packet. The latest Mark is rather larger than any of the eight preceding types; the main difference lies in the engines, two Wright Turbo-Cyclones; all fuel is carried in external underwing tanks. This latest Mark has a range of 2,440 miles as a maximum; it has a payload of no less than 15 American tons of 2,000 pounds each.

The next class of long range aircraft is typified by Handley Page Hastings, which has been made in several different Marks. As a freighter, it can accommodate bulldozers, or anti-tank guns, or three-ton tanks; another version carries 30 paratroops and 20 containers; the ambulance accommodates 32 stretcher cases and 28 sitting, with four medical attendants and a ton of medical supplies; the troop carrier will accommodate 50 fully armed troops. A jeep can be carried and dropped by parachute; there is another Mark, in which the sole cargo consists of panniers and containers with their parachutes.

The world's most advanced type of Military transport is perhaps Boeing Model 707, a high speed military transport or tanker; as in this country, it would be possible to convert this aircraft from transport of freight or troops to the movement of civilian passengers. Like Boeing B-47, the new aircraft will have swept wings, and four Pratt & Whitney jet engines of approximately 11,000 pounds thrust each; the general size and appearance corresponds closely to that of the Atom Bomber, Boeing B-47; but this new model has a narrow oval fuselage with two decks, main passenger accommodation on the upper one, leaving the lower deck available for baggage and freight. The first Boeing Stratofreighter was delivered late in 1949, and was able to transport 83 stretcher patients or 134 fully equipped troops; there have been at least six Marks since, the last three of which have been equipped with various types of refuelling tanks and booms. In all of them, the tanks and their equipment are so arranged that they need not be removed when the aircraft is used for passenger conveyance.

The Douglas Globemaster, C.124X, now some years old, has appeared in several different Marks; the latest of these still uses four 5,500 h.p. Pratt & Whitney turboprops, and has improved arrangements for the main loading doors. This great aircraft has an electrically operated elevator in the middle of the cargo hold. The inside of the hold can be converted into a double deck cabin with capacity for 200 troops and their equipment; as an ambulance, the Globemaster will carry 127 stretcher cases, 52 sitting patients, and medical attendants.

The three water-based transports each have something to commend them. The largest and most impressive is the Saunders-Roe Princess, not only able to carry nearly 20 tons of payload, and to convey the dismantled components of a floating dock for assembly in a remote lagoon, but also the men to erect the dock, and the mechanics to maintain Princess and other water based aircraft, in a forward area.

The next most important transport is Convair Tradewind, the prototype of which flew in April of 1950; it was then intended for an experimental and high performance long range patrol flying boat, with four Allison turboprops of 5,500 h.p. each. The latest version has gone into production, and may carry casualties, troops, or cargo. A large cargo-loading door is located in the port side, and there are personnel-loading doors on both sides of the hull.

At the time of writing, little or no information is available about the Glenn Martin "Sea-Master," with four jets, and capable of high speed. "Jane" says, on page 254 of the current issue, that "it will be radically different in its concept and design from any other type of sea-going aircraft." From papers given by Mr. Ernest Stout of Convair, both in this country and in U.S.A., it might be guessed that the shape of "Seamaster" would be a delta, not very different from Avro Vulcan. It seems likely that "Seamaster" might well look rather like a dragonfly, with its unusually long after body, the hull blended into the wings to eliminate wing-tip floats, the chines fitted with spray dams to throw the spray downwards, and quite possibly a retractable step.

In the same period, there was an article in the American Journal styled "Mechanical Engineering" dealing with the same subject. Colonel William Bunker wrote on the question of "design proposal for a Military helicopter." He referred to the use of small two-passenger helicopters in Korea, which had brought down thousands of casualties from the front line; and went on to propose a cargo helicopter to be used in large quantities to overcome broken bridges, road blocks, broken down transport, and above all the deep mud so well known to anyone concerned with land operations. Because this would be a purely utility vehicle, he thought that it should be designed as an aerial 2½ ton truck; it would carry 20 passengers, or equipment such as gun or tractor up to a total of 6,000 pounds, two Companies of 21 helicopters each could keep a Division supplied; three such companies could move a Battalion in one lift.

Colonel Bunker went on to deal with two other helicopter types for land warfare; a large one of 25,000 pounds payload, to carry a loaded truck; and a small one of about 1,000 pounds payload, for liaison and observation.

All these air vehicles should be built on the simplest lines; speed was not necessary, and 100 to 150 m.p.h. would be ample; it has been agreed between the U.S. Army and Air Force that the major rôle of Army cargo helicopters would be the transport of Army units and equipment within a combat zone 75 miles or less in depth, as for example from dump to the front line unit.

Much more than speed would be the possibility of rapid loading and unloading; an artist's impression in Colonel Bunker's article shows a helicopter with an open-work body of angle-iron or tubing, with a floor strong enough to carry a loaded vehicle. The article suggests canvas curtains to protect passengers and equipment from the weather, removable when such cover is unnecessary. An assault transport version of Sikorsky S.55 has "nylon flak curtains."

In American "Aviation" of November 23, 1953, the Chief Engineer of the Bell Aircraft Corporation discussed helicopters of the future, especially in regard to engine power. In particular, he referred to the large anti-submarine helicopter XHSL-1; and said that although he would have preferred two engines, the U.S. Navy asked for one main engine. The single engine does, however, drive two tandem rotors; these can be folded to enable the helicopter to enter the lifts in aircraft carriers, or to be accommodated in other vessels. The Chief Engineer of Bell Aircraft commented upon the weight and complication of the gearing with either geared piston engines, or geared turbines, which might be better in view of the smaller empty weight. He thought that the solution to the rotor drive problem might well be jet driven rotor tips, in view of the great simplicity of this design; and went on to say that very large helicopters might use turbo-props, with engines and all on the tips of the very large rotors.

As compared with 12 months ago, there have been marked changes in the trend of helicopter design; these are of three types:

(i) The emergence of very small single seat helicopters; the American Helicopter Company's XH-26 is typical.
(ii) On both sides of the Atlantic, the development of large anti-submarine helicopters such as the British Bristol Type 171, and the Bell XHSL-1 referred to above.
(iii) The rapid development of at least five types of convertiplanes, able to take off vertically by means of their main rotor, and then to cruise, with the aid of stub wings, powered by two small piston engines driving propellers.

Since convertiplanes are at present in the experimental stage, none of them has been included in Table VI as yet. The Table now contains samples of the smallest as well as the largest of helicopters, and especially those intended for specified Military applications.

Bristol Type 171 Sycamore has been built in no less than seven different Marks; Mark IV is in production at present, as a passenger and freight transport; but it is capable of rapid conversion for casualty evacuation or search and rescue. It has one 525–545 h.p. Alvis Leonides.

Bristol Type 173 is the first British multi-engine helicopter; it is powered by two Leonides engines, and uses two similar rotors, one at each end, each driven by its own engine. Three such aircraft will go into experimental passenger service with British European Airways.

The Westland S.51 Dragonfly exists in four Marks, with varying equipment; Marks 1 and 3 are both in service with the Royal Navy, the first intended for air-sea rescue and special photography; Marks 2 and 4 are in service with the R.A.F., the former for casualty evacuation. All types have the Alvis Leonides engine.

The Bell Aircraft Corporation manufactures a wide range of helicopters; Model 48 has 10 seats, and its tactical missions include cargo, observation, liaison, fire control, and personnel evacuation. This helicopter carries flotation gear for operation off water.

Bell Model 61 is the first American helicopter to be designed specifically for anti-submarine warfare; it is the first Bell helicopter to depart from the single rotor layout; and the two rotors are driven by a single engine.

The Gyrodyne Company was specially formed to build rotating-wing aircraft; its Model G.C.A.2 is a six-seater, with two-blade coaxial rotors; it has six seats and a single 450 h.p. Pratt & Whitney engine. Gyrodyne G.C.A.3 Helidyne is a convertiplane, which will have two 600 h.p. Pratt & Whitney engines driving pusher air screws direct, and the main rotor through clutches. It will be equipped with a clam-shell door and a power hoist for loading while hovering. This firm have, in the design stage, a 54-passenger Gyroliner.

The Piasecki Retriever is a single-engined tandem-rotored helicopter; its duties include carrier plane, guard duty, rescue, observation and transport duties; with blades folded, it will go down a standard cruiser aircraft lift. During the year Piasecki have built two larger Military aircraft, H.21, a development of the Rescuer, and XH.16. The former has accommodation for 12 stretchers or 14 troops; loads can be embarked or lowered while hovering; each wheel of the fixed landing gear is provided with inflatable floats to permit landing on water. The Piasecki Transporter XH-16 has two 1,650 h.p. Pratt engines; it is intended for long range rescue, troop transport, cargo transport with a detachable pack or pod, and casualty evacuation, carrying either seats for 40, or 32 stretchers.

Two versions of this helicopter are being built, one with reciprocating engines. The second version, designated the YH-16A, will have two Allison T38-type turboprops. Experience in Korea has demonstrated the need for helicopters as big as the YH-16. This aircraft can transport 40 fully equipped soldiers to the battlefront and land them without the need for landing strips, and regardless of rough terrain or lack of roads. For moving supplies, including guns and ammunition, it is not necessary to load the YH-16 internally. A sling underneath the fuselage can be used to carry equipment, and the pilot can release his cargo from the cockpit while hovering. The Piasecki Transporter is designed to carry a cargo pack fastened on the belly of the aircraft. The pack or pod is on wheels, and can be loaded and unloaded, or moved about on the ground, independent of the helicopter, much like truck trailers. In this version, the capacity of the YH-16 is equal to that of a boxcar. When equipped with a cargo pack, the YH-16 uses a tall landing gear that raises the fuselage about 10 ft. off the ground, permitting the pack to be fastened or removed with ease. The short and long-legged landing gears are interchangeable.

The YH-16's gross weight is in excess of 15 tons. In the YH-16A version, because turbine engines are lighter than piston engines, the proportion of payload will exceed that of the YH-16. The YH-16 includes provisions for an automatic pilot capable of complete blind flight with fingertip control and maximum safety. For commercial application, the manufacturer is planning airline versions of the YH-16 Transporter. In addition to providing a greater payload, advantages of the turbine version will be additional cabin space, shorter engine warm up periods, less vibration and the added safety of carrying less volatile fuel because the turbines burn kerosene instead of gasoline.

The latest Sikorsky helicopter is S-56, developed for the U.S. Marine Corps. It is remarkable for its considerable power, with two Pratt &

Whitney R.2800 engines, of about 1,450 h.p. each at take off. It is a single-rotor helicopter comparable in size to the Douglas DC3 twin-engine transport. The two engines are slung in pods, outboard of the fuselage on short wing-stubs. Power from both engines is transmitted to the five-blade main rotor and the small tail rotor, both of which fold for easy handling aboard aircraft carriers and orderly stowage on the hangar decks. The XHR2S is believed to be the first helicopter ever built with retractable landing gear, a feature which contributes greatly to a top speed of well over 150 miles an hour. For instrument flight in bad weather the XHR2S carries an automatic pilot and anti-icing equipment. This helicopter first flew on September 10, 1953. It is intended for about 26 fully equipped Marines.

The most recent information in regard to convertiplanes is contained in a special number of "Flight," dated March 12, 1954. Bristol Type 173 Mark II is provided with stub wings, but without propellers; whereas three Mark III helicopters or convertiplanes are under construction for British European Airways, powered by two 850 h.p. Alvis Leonides Major engines.

The Fairey Rotodyne has been ordered for experimental or research purposes; it will be powered by two Napier Eland turboprop engines of 3,150 h.p. each, with tip driven jet rotors.

The Bell convertiplane is still secret, being only in the project stage.

The Sud-Ouest 1310 Farfadet is the first French aircraft of the Gyrodyne type, able to take off vertically or land vertically, but equipped also with fixed wings and a propeller which is independent of the rotor. During forward flight, the rotor continues to turn in auto-rotation at low lift. Propulsive power is provided by two small gas turbine units, one supplying compressed air to the jet driven rotor, and the other driving a single variable pitch air screw in the nose of the fuselage.

Another complete convertiplane is ready for flight as this book goes to press; it is the McDonnell XV-1 convertiplane, embodying, like other convertiplanes, "the unloaded rotor principle": the machine is equipped with a rotor for vertical flight and wings and propeller for forward flight. In vertical flight or hovering, the rotor provides all the lift; in forward flight the wings provide almost all the lift. This allows the rotor to autorotate at its lowest drag configuration, thus avoiding the speed limitation encountered by conventional helicopters due to the stalling of blades when they must carry lift at high speeds. Each of the three blades of the rotor is powered by a McDonnell-developed pressure jet unit located at the tip of the blade. A Continental reciprocating engine is provided on the aft fuselage to supply air to the pressure jet units during vertical flight and power to the propeller during forward flight.

The efficient and relatively great power available from the pressure jets allows the use of a rotor having approximately half the drag of a conventional helicopter rotor. Since the wings do not provide the lift during take off or landing, they are approximately half the size of the wings for conventional fixed wing aircraft. Therefore, speed performance of the convertiplane is not greatly penalised by utilising both rotor and wing. The XV-1 is designed to carry three passengers, or two litter patients and medical attendant in addition to the pilot. The craft is approximately 30 feet long, ten feet high and spans 26 feet in width.

Two non-retracting skids comprise the landing gear of the XV-1. The skid gear differs from previous skids in that energy is absorbed during hard landing by the yielding of replaceable stainless steel straps. Fuel is fed to the three pressure-jet rotor-tip burners through a rotor fuel governor driven from the rotor hub accessory drive; the pressure jets operate on the principle of ignition and expansion of the fuel gases, then exhausting rearward through nozzles to provide thrust. The application of power directly to the blade tips eliminates the torque which in conventionally driven helicopters must be eliminated by the use of a second rotor or propeller.

DEVELOPMENT OF ANTI-SUBMARINE AIRCRAFT

On February 3, 1954, a Royal United Service Institution lecture dealt with the military applications of water based aircraft; the speaker referred to the article by Professor P. M. S. Blackett in the 1953 Brassey's Annual; and suggested that anti-submarine problems should once again be considered by a council of scientists, in exactly the same manner in which Professor Blackett and his team solved many of the operational and tactical problems of Coastal Command during the war.

Research at that time resulted in the saving of hundreds of ships, thousands of lives, and millions of money; and as our investment in anti-submarine aircraft is considerable, this well-understood technique might possibly be applied again to anti-submarine problems.

Such high power operation research in this country might determine whether or not the flying boat is a necessity or otherwise on this side of the Atlantic; in Europe, any future war would be fought over the land mass of the continent, and land planes might prove to be more necessary than any other type. The U.S.A. is faced with the opposite problem. Operations would be over at least two oceans, with thousands of coral islands as bases, provided that they were used by water based aircraft.

Doubtless with this in view, much of the U.S.A. anti-submarine effort has been concentrated in flying boats; many millions of pounds have been spent upon research which has produced two outstanding types of water-based aircraft; the Convair Sea-Dart, able to alight on water, and take off, by means of its hydro skis; and, as a by-product of similar investigations, two large anti-submarine flying boats, Convair Tradewind and Glenn-Martin Marlin.

Marlin has two engines; on more than one occasion recently it has been stated that the U.S. Navy or U.S. Marines have required one engine instead of two for a helicopter and two engines instead of four for a long range anti-submarine flying boat. The difference in cost and in man hours between an aircraft with two engines and one with four is very considerable; and it may be that in the U.S.A. the Government may decide on some policy involving perhaps twice as many Martin Marlins as Convair Tradewinds. At present, both are on order in quantity.

The development of these two flying boats in U.S.A. results from enormous expenditure upon research, to overcome the obsolescence of great aircraft of the past, such as Short Sunderland and Convair Catalina; both were long range aircraft, much too slow for modern warfare; Catalina had the disadvantage that a reserve crew could not be carried; in

Sunderland, off-duty members of the crew could sleep, or even take exercise up and down the passages of its vast hull; and what is more important, they could be provided with excellent hot meals at any hour of the day or night.

The new water-based aircraft have all these advantages, and much more. Both Marlin and Tradewind have long range, ample space for duplicate crews, sleeping accommodation and a galley; both of them have the new type of hull, long in relation to its beam, and giving much increased speed and range; both have ample fuel capacity, and Marlin has about a ton of electronics, and, as well, the same type of searchlight which was used on Liberators and Sunderlands for spotting submarines at night. But despite the maximum range of Convair Tradewind, 4,500 miles, this is less than that of the long range reconnaissance aircraft, Short Shetland, built to the R14/46 specification. One of the American flying boats has Wright Turbo-compound engines for economy; the other, Tradewind, has four gas turbines, of 5,500 p.p. each driving propellers.

One other feature of new American boats is an improved technique to ensure seaworthiness; just above the water line, and parallel to it, the lower hull is divided into 12 or 15 permanently sealed compartments, any two or three of which could be holed, with little effect upon the seaworthiness of the hull. The specification made the proviso that these boats were to be suitable for "operations in relatively unprotected forward areas, for protracted periods of time." On Glenn-Martin Marlin there is a central fuelling point to permit fuelling at sea from a ship, or from a refuelling buoy when moored out.

As in the United Kingdom, the U.S.A. has been developing helicopters for anti-submarine service; and one or two or them are able to alight on water as well as on land. The most spectacular developments in U.S.A. are the quantity production of Lockheed P2V Neptune, and at least a prototype of the Lockheed Super-Constellation, equipped with immense radomes for anti-submarine detection, as regards the one below the fuselage, and early warning as the duty of the still more enormous radome on top of the fuselage.

Of these Lockheed types, Neptune is the most important to us; this is the aircraft which at one time made a world's distance record, still standing, of about 11,000 miles without refuelling. Neptune is used by British Services as well as by the U.S. Navy; it was specially designed for long distance patrol and reconnaissance, combined with high speed and a considerable load of electronics and armament. It would not be impossible to fit this large aircraft with floats if necessary; and one model of Lockheed P2V-2N had retractable ski gear for experimental landing on Arctic Islands.

The latest model is P2V-7; it could carry airborne mines, being classed as a mine layer; and appropriate detector gear to locate, and guide to attack, a submarine even though nothing but the snort is visible. During a discussion in February, 1954, at the Royal United Service Institution, Air Vice Marshal Chilton referred to the difficulty of locating a submarine which might require no snort; Lockheed claim to have the answer to this, in the addition to their Neptune of still more sensitive electronic equipment, said to be adequate for the detection of a submarine up to at least 100 ft. below the surface of the sea.

Introducing the Naval Estimates in March, 1954, Mr. J. L. Thomas, First Lord of the Admiralty, said that the Fairey Gannet, the first specialised anti-submarine aircraft, would be coming into squadron service later in that year. Anti-submarine aircraft would be equipped with improved radar for snort detection, and would carry sonobuoys for the tracking of submerged submarines. He also referred to Short Seamew, a light anti-submarine aircraft designed for rapid production and ease of operation from trade protection carriers; Short Seamew would be in full production before the end of 1954.

The range of anti-submarine aircraft falls into three clearly defined divisions:

(i) Large aircraft, land-based or water-based, for long reconnaissance over the sea; Avro Shackleton and their Australian-built Lincoln, Martin Marlin and Convair Tradewind are examples. Lockheed Super-Constellation, with early warning equipment, is the most up-to-date.

(ii) Carrier-based aircraft such as Fairey Gannet, and the ubiquitous Firefly, also available as an anti-submarine trainer; Short Seamew; and the American trio of heavy aircraft—the Douglas A3D-1, Lockheed Neptune, and North American Savage.

(iii) Helicopters such as Bristol Sycamore, Bell 61, and Sikorsky S.55.

Avro Shackleton first flew in 1949, and the Mark 2 prototype in June of 1952; the first Australian Lincoln flew in March, 1946; both can carry double crews, which makes for efficiency in watch-keeping. Neither can do very much to rescue ditched crews. Marlin and Tradewind have been previously referred to; like Short Sunderland and Nord 1402 Reconnaissance and Rescue amphibian, they have all the advantages of the landplane, combined with the ability to alight, on errands of mercy, even in a rough sea.

Fairey Gannet is a three-seat carrier-based aircraft, powered by Armstrong Siddeley Double Mamba; it was the first aircraft to fly with a double turboprop engine. The prototype flew in September of 1949. The advantages of the double engine have been referred to in earlier editions of Brassey. Few details have been released; and the current "Jane" says laconically "no data available for publication."

Short Seamew made its first public appearance at the S.B.A.C. Display at Farnborough, on September 7, 1953, and is in production for the Royal Navy. Quoting from Jane's "All the World's Aircraft," page v of the Addenda, "It has been specifically designed for easy and cheap production, and is intended primarily for convoy protection. For this reason it is very light and has an extremely low landing speed, thus permitting its use from small escort carriers and from merchant ship carriers." The engine is an Armstrong-Siddeley Mamba turboprop. In "The Aircraft of the World," published by Macdonald of London, the following details are supplied: Loaded weight, 14,000 pounds; Span 55 feet: folding wings, and span folded 23 feet; the description adds that "the Seamew A.S.1 has been specifically designed for operation from escort carriers of NATO forces." In "Flight" of January 1, 1954, a paragraph on page 17 reads "It is reported in America that the weapons to be carried by this light anti-submarine aircraft probably include "the same variety of guided torpedoes that the Fairey Gannet will carry."

The Seamew represents a class of aircraft not developed in U.S.A. But both U.S.A. and ourselves might recall that when our minds were filled with the immensity of our losses of ships in the Atlantic, Sir Winston Churchill was equally concerned about the losses of tankers in the Caribbean, one a day for months; belatedly the hard-pressed Americans spared aircraft, or rather, flying boats, and swept the seas of enemy submarines in only a few weeks. This points to the need, in war, for what they style "the coral-island technique," where float planes can operate from the lagoon, though airstrips would be out of the question. In lieu of anti-submarine float-planes, both the Americans and ourselves might convert light aircraft such as Seamew, using the single central float designed by one of the three Short brothers, Oswald, and first flown in 1911 by Lieut. Arthur Longmore, R.N.

Lockheed Neptune is well known to the British Navy; North American Savage has a span of 71 feet, or 48 feet folded; it has piston engines supplemented by a jet; and is said to be the first carrier-borne aircraft capable of carrying an atomic bomb.

Two of the helicopters have been referred to elsewhere in this article; Bell Model 61, styled XHSL-1 by the U.S. Navy, has one engine, but two folding rotors; it was specifically designed for anti-submarine warfare, the contract being awarded to Bell immediately after the design was successful in winning a U.S. Navy anti-submarine helicopter competition in June of 1950.

Speaking at the Royal United Service Institution on February 3, 1954, Air Vice Marshal C. E. Chilton drew attention to the need for research into electronic detection devices which would locate a modern submarine submerged at considerable depth. He said "Money is indeed required, but the money is there: it only needs the scientists to give us the answer."

The desirability of operations research, of the type referred to by Professor P. M. S. Blackett in his Brassey article last year, was frequently referred to in the discussion, from which the following phrases may be quoted: *

> "Projected to be twice the size of Marlin, an aircraft has been designed for operation in very severe weather conditions. Tests have demonstrated the practicability of producing a flying boat that can land in the open ocean and refuel from a ship, for at least 80% of the year, with great operational advantage. What is wanted is an official operations team to investigate exactly where, in the general strategy, such aircraft will be needed."

In the same discussion, it was stated that the latest Lockheed Neptune P2V-5 had search radar capable of seeking out and locating enemy submarines lurking hundreds of feet beneath the ocean's surface; and their early-warning Constellation has six tons of radar equipment, with a crew of 31, including relief pilots, radar officers, technicians, and maintenance specialists. Corresponding equipment might be applied to the anti-submarine problem.

G. W. WILLIAMSON

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* Mr. Petre Crewe, of Saunders-Roe

TABLE I

Some Twin-Jet Fighters

Maker and Type	Span ft. in.	Gross weight, lb.	Static thrust, lb.	H.P. at 600 m.p.h.	Thrust Weight Ratio
de Havilland D.H.110 ..	51	30,000	15,000	24,000	0·5
Gloster Meteor N.F.11 ..	43	11,000	7,000	11,000	0·62
„ Javelin	52	27,000	16,600	26,500	0·62
Supermarine 508	41	20,000	14,400	23,000	0·72
Avro (Canada) Canuck ..	52	34,000	14,000	22,400	0·41
Chance-Vought Cutlass ..	38	23,300	9,600	15,200	0·42
Douglas Skyknight.. ..	50	27,000	9,600	15,300	0·35
McDonnell Voodoo ..	39 8	40,000	10,400	16,700	0·25
Northrop Scorpion ..	56	30,000	10,000	16,000	0·33

TABLE II

Some Single-Jet Fighters

de Havilland Venom ..	41 9	14,000	5,000	8,000	0·36
Hawker Hunter F.2 ..	33 8	16,000	8,300	13,300	0·52
Supermarine Swift ..	31 9	20,000	7,500	12,000	0·35
Douglas Skyray	33	20,000	10,000	16,500	0·56
Grumman Cougar ..	38	16,700	5,000	8,000	0·30
„ Jaguar	38	29,000	7,500	12,000	0·26
Lockheed Starfire.. ..	38 10	27,000	7,000	11,300	0·26
McDonnell Demon ..	40	22,000	9,500	15,200	0.43
North American Super-Sabre	36	27,000	10,000	16,000	0·37
Republic Thunderstreak ..	33	22,000	8,300	13,300	0·38
Dassault Mystère	33 6	15,000	7,500	12,000	0.44
MiG.15	33	14,240	6,000	9,600	0·67
Saab Lance	37	17,000	6,250	10,400	0·38

TABLE III

Bombers, All-Jet or Jet-Assisted, in Order of Size

Maker and Type	Span, ft.	Weight, tons	E.H.P.*	Remarks
Convair YB-60	206	180	117,000	8-jet
,, B.36	230	163	53,000	Maximum range, 10,000 miles. Maximum load 42 tons.
Boeing Stratofortress ..	185	150	110,000	8-jet.
,, Stratojet ..	116	82	58,000	Speed 600+.
Handley-Page Victor ..	120	75	48,500	American estimated weight.
Avro Vulcan	103	75	64,000	do.
Vickers Valiant	114	75	38,000	do.
North American R.B45C	90	50	32,000	Speed 550+. Range 1,200 m.
English Electric Canberra	64	20	22,000	Speed 555. Range 1,500 m.
Sud-Ouest 4000 ..	58	20	14,700	

**E.H.P. is the Equivalent Horse-power at 550 m.p.h.*

TABLE IV

Military Transports

Maker and Type	Span, ft.	Weight, tons	H.P.	Maximum Load and Maximum * Range
Douglas C.124.B ..	173	87	22,000	25 tons; 6,280 m.
Boeing C.97.A	141	73	14,000	34 tons; 3,750 m.
Blackburn and General Universal Transport	162	60	11,500	21 tons; 1,750 m.
Lockheed Super Constellation	117	75	22,400	22 tons; 5,500 m.
,, C.130A ..	132	60	15,000	
Handley Page Hastings	113	36	6,700	9 tons; 3886 m.
Fairchild C.119	109	42	6,500	15 tons; 2,440 m.
Chase C.123	110	35	4,800	14 tons; 5,060 m.
Bristol Freighter ..	108	19	4,000	5 tons; 1,680 m.
Nord Nor-Atlas.. ..	106	19	4,000	5 tons; 1,000 m.
Vickers Valetta	89	16	4,000	5 tons; 1,410 m.

**Maximum range is stated for a military load much less than the maximum.*

TABLE V.

FLYING BOATS

Maker	Name or Type	Weight (tons)	Speed (max.)	Range	Total H.P.
Saunders-Roe	Princess	140	380	5,500	35,000
Short	Sunderland	27	213	2,690	4,800
Short	Solent	35	276	2,200	8,160
Short	Sealand (t/e amphib.)	4	189	425	850
Convair ..	XP.5.Y.1, long range, patrol	80	380	10,000	22,000
Convair ..	Sea-Dart	8	580	—	9,300
Grumman ..	Albatross amphibian	12	270	1,400	2,850
Grumman ..	Mallard	56	215	1,380	1,200
Martin ..	Marlin P.5.M.2	38	—	—	6,000
Martin ..	Seamaster	70	530	—	56,000
Nord	Noroit	—	230	2,610	2,400

TABLE VI

SOME LARGE HELICOPTERS*

Maker	Type	Seats or Pay Load	H.P.	Total Weight
Bristol	Type 173	16	1,700	14,500
Fairey	Rotodyne	40	6,300	—
Percival	P.74	8	—	7,750
Westland Sikorsky ..	S.55	12	800	7,200
Bell Model 61	USN-XHXL-1	anti-sub	1,700	—
Hughes	XH-17	10 tons	5,000(?)	77,500
McDonnell	XCH-1	heavy cargo	—	—
Piasecki	H.21 Workhorse	16 rescue	1,150	14,000
„	PV.15 Transporter	40	3,300	—
Sikorsky†	S.55	12	550	6,835
„	S.56	34	3,300	—

**Including only those under construction or flying.*
†Several more powerful military types of S.55.

TABLE VII
Some Large Propeller Turbines

Maker and Type	Shaft horse-power	Thrust, lb.	E.H.P.*	Weight, lb.	Pounds per E.H.P.
Armstrong					
Mamba, Mk. 504	1,320	405	1,725	800	0·45
Double Mamba	2,640	810	3,450	2,150	0·62
Python	3,670	1,150	4,820	3,450	0·71
Bristol					
Theseus	2,220	825	3,045	2,205	0·73
Proteus 3	3,320	1,200	4,520	2,650	0·60
Napier					
Eland	3,000	241	3,000	1,575	0·50
Double Naiad	2,970	482	3,452	2,200	0·65
Rolls					
Clyde	3,500	1,200	4,700	2,500	0·55
Dart	1,400	310	1,710	850	0·50
Allison					
T38	—	—	2,750	1,225	0·45
T40	5,125	830	5,955	2,575	0·47
Curtiss Wright					
Typhoon	—	—	10,000	—	—
Pratt and Whitney					
T34-P-2	5,300	1,040	5,700	2,550	0·40
T48	—	—	10,000	—	—

**E.H.P. is Total Equivalent Horse-power at 375 m.p.h.*

TABLE VIII
Large All-Jet Turbines

Name and Type	Thrust, lb.	E.H.P.*	Weight, lb.	Pounds per E.H.P.
Armstrong				
Sapphire	8,300	14,400	2,500	0·17
Bristol				
Olympus	9,750	17,000	3,520	0·21
Rolls-Royce				
Avon RA.14	9,500	16,500	2,860	0·17
Tay	6,500	11,300	2,000	0·18
Nene	5,000	8,700	1,550	0·18
Conway	10,000	17,300	—	—
de Havilland				
Ghost	5,125	9,000	2,218	0·25
Avro (Canada)				
Orenda	6,500	11,300	2,650	0·23
Allison (U.S.A.)				
J.33	5,200	8,850	2,218	0·24
J.35	5,600	9,700	2,260	0·23
J.71-A-1	10,000	17,300	4,400	0·25
General Electric (U.S.A.)				
J.47	5,200	8,700	2,500	0·29
J.73	9,200	16,000	3,600	0·22
Pratt and Whitney (U.S.A.)				
Turbo-Wasp. J.42 (Nene)	5,000	8,700	1,723	0·20
J.48 (Tay)	7,000	12,000	2,800	0·23
J.57	10,000	17,300	—	—
Westinghouse (U.S.A.)				
J.40-WE-8	7,500	13,000	3,000	0·23
Wright (U.S.A.)				
J-65 (Sapphire)	7,220	12,500	2,500	0·20
J.67 (Olympus)	9,750	17,000	3,520	0·21
Turbomeca				
Snecma Atar	6,600	11,500	2,094	0·18

**E.H.P. is Equivalent Horse-power at 650 m.p.h.*

CHAPTER XXXIV

ENGINEERING FACTORS AFFECTING NAVAL OPERATIONS

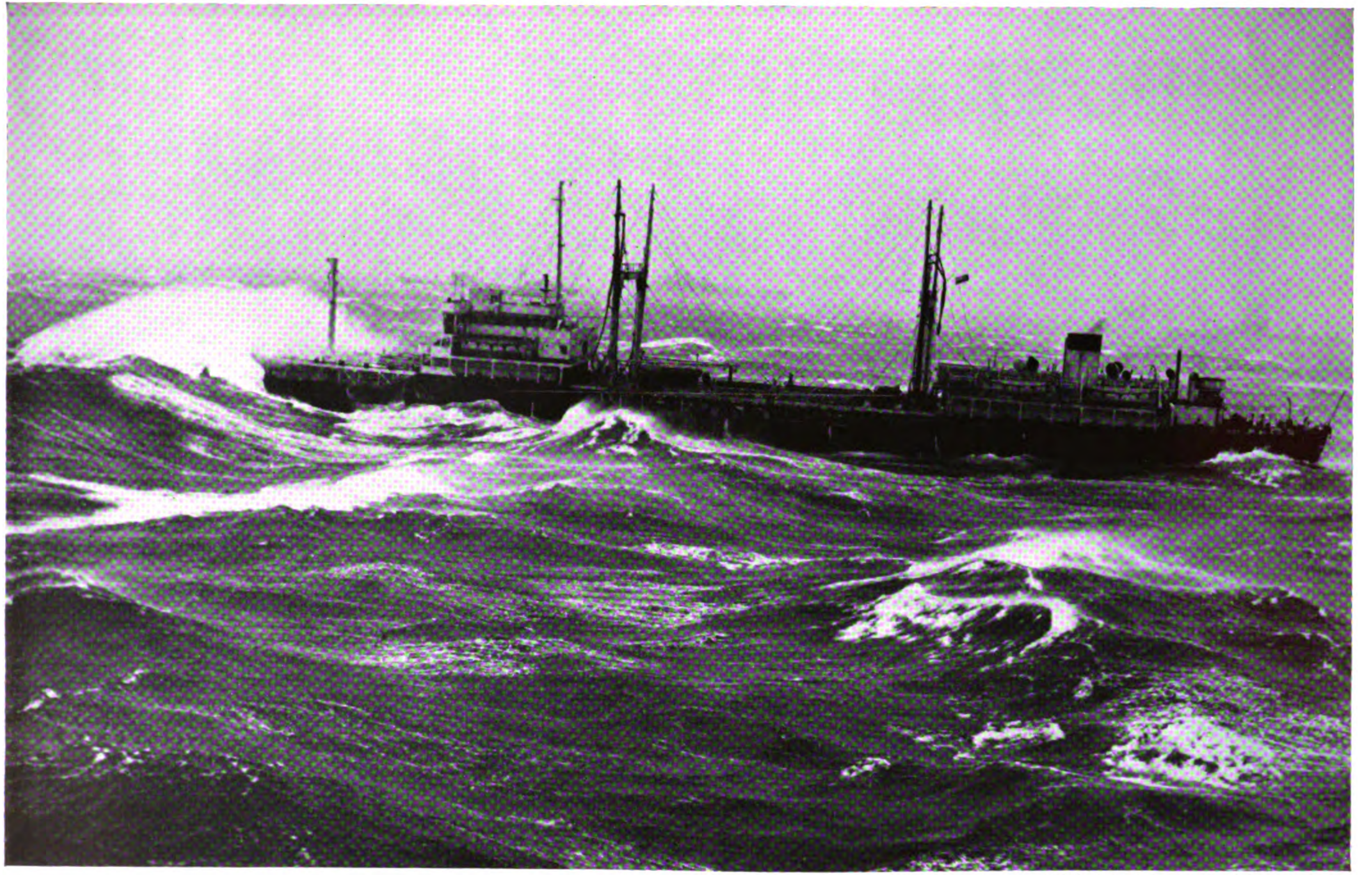
By Commander (E) A. Funge Smith, R.N.

In the 1953 Edition of Brassey's Annual an article by "Ned" on the subject of The Fleet Train reviewed many of the problems of the past associated with the supply of food, water, stores, ammunition and fuel for warships and of the more recent developments which led to an improvement in the mobility of warships by the addition to a fleet of a group of supply ships capable of replenishing warships at sea thousands of miles from any storing yard. The problem of increasing the operational use of warships is a complex one and this article attempts to present some engineering aspects of this same problem, viz. those associated with the operation and maintenance of naval machinery, and outlines some of the engineering developments that have taken place in the Royal Navy which have increased the time warships can be used and maintained in an efficient state at sea between planned refit periods.

In the days of sail, the ability of a ship to "keep the seas" was not dictated by any limitations of mechanical power and there was no fuel problem. The maintenance of a ship in an efficient state was comparatively straightforward; wood for spars and masts could either be carried on board or obtained at almost any port in the world; spare canvas was carried and skilled carpenters, shipwrights and sailmakers were part of a ship's complement, ready at hand to make good any defects and effect any repairs that were necessary. The nineteenth century saw all this changed and by 1877 the famous Naval Architect, Sir Edward Reed, in a letter to "The Times" described the man-of-war as a Steam Being. As the main propulsion machinery became more powerful, ships became faster, but the time they could spend at sea was dependent mainly upon the efficiency and reliability of the machinery and the amount of fuel each ship could carry. To improve this position fuel and repair bases were established at strategic points throughout the world but, even so, periods at sea were comparatively short. With the turn of the century, coal gradually gave place to furnace fuel oil and turbines displaced the magnificent old reciprocating engines. During the First World War high-speed geared turbines began to replace the larger direct-drive turbines, and later saturated steam boilers were superseded by higher-output superheated steam boilers. The search for lighter machinery occupying less space and of higher efficiency has been going on continuously. Naval machinery is becoming more efficient but to meet the latest requirements in methods of naval warfare a greater quantity and variety of electrical, electronic and mechanical equipment has to be fitted into a warship, which in turn entails a larger staff to operate and maintain it. Any space saved by providing propelling machinery which uses less fuel per horse power and which is smaller and lighter in weight than before has been absorbed to meet other needs, such as additional equipment, accommodation, storage space and maintenance facilities. It is, however, not just sufficient to design the lightest, smallest and most economical form of propelling machinery. Advanced designs of machinery must go hand in hand with reliability and ease of maintenance; main and auxiliary machinery must be simple to operate and speedily maintained with the tools and equipment provided for that purpose.

BOILERS

By the end of the First World War, furnace fuel oil had generally replaced coal in the Royal Navy for use in warships. The saturated steam boiler, however, was still the standard type in the Fleet. The slow rate at which the fuel could be burnt in the furnace and the great volume of steam needed for the higher powers made possible by the adoption of the steam turbine, necessitated a large number of boilers in each ship. The battleship H.M.S. "Queen Elizabeth", completed in 1915, had 24 oil-fired boilers working at 235 lb. per square in. for 75,000 shaft horse power. To prevent the accumulation of deposits and to counteract corrosion of the internal surfaces, boilers had to be cleaned internally every 21 days whether they had been steaming the whole or only part of a day, and cleaning all boilers was a major operation. Operational planning was largely dictated by this requirement but during the boiler-cleaning periods other departments of a ship were able to deal with their maintenance work. By 1939 boiler pressures in the Royal Navy were 60–80% above those in use during the First World War and superheated steam had been universally adopted throughout the ships of the Fleet; an output of 75,000 S.H.P. could now be obtained from 4 superheated steam boilers working at 400 lbs./sq. in., but boiler cleaning was complicated by superheaters and intricate internal fittings. The rules for internal cleaning were on an hourly basis but 500 hours steaming was the maximum time permitted between successive internal cleanings. Frequent boiler-cleaning periods each of about 6–10 days' duration was still a major factor in planning the availability of the Fleet for operational service, and many a Commanding Officer was glad of these periods to give him and his ship's company a rest from the arduous duties at sea. Towards the end of the Second World War a method of treating the boiler water by a chemical known as Admiralty Boiler Compound was adopted. This compound when mixed in carefully regulated dosages with the boiler water and combined with a strict control of salinity and alkalinity neutralises the corrosive action of the water on the internal surfaces of a boiler. From experience gained by the use of this compound, it was soon found that provided a boiler was washed through after every 1,000 hours steaming, which only takes a matter of a few hours to accomplish, it could be safely steamed for a period of 12 months before a thorough internal clean became necessary. Had this factor been the only one preventing an extension of the use of warships on operational service, it would have completely revolutionised the mobility of the Fleet. As it was, the writer estimates it increased the use of warships by some 6–10%; but after struggling to compete with the changed situation the maintenance staffs had to bring to greater prominence that there were other requirements which had to be attended to regularly, and which could only be done, with the limited staff available, when a ship was in harbour. From



(*Official Admiralty Photograph*)

N.A.T.O. Exercise in Atlantic. British naval tanker Wave Victor in Exercise Mariner

an engineering point of view some of these were the external cleaning of boilers, refitting distilling plants and descaling evaporator coils, refitting steam valves and steam joints, cleaning fuel oil tanks and the routine inspection and adjustment of machinery. In addition, the maintenance requirements of the gunnery, electrical and hull departments "broke surface", which hitherto had almost always been hidden behind the requirements of the engine room department. Above all was the problem of providing rest periods for personnel. Maintenance and rest periods had to be organised on a different basis. The position could not, however, be allowed to rest there; means had to be found of reducing and simplifying the amount of maintenance work required and improving the conditions under which a ship's company had to live and work, so that warships could be kept in a state of high efficiency for even longer periods at sea and the morale, efficiency and well-being of a ship's company maintained at a high level during the whole commission.

Prolonged periods of steaming tend to produce an accumulation of soot and other deposits in the gas passages of a boiler, and to retard the formation of these deposits permanently-fitted steam-operated soot-blowers are now standard fittings with naval boilers. A great advantage of these fittings is that they are intended to be worked while the boilers are steaming, but even so after a period of about three months warships have to be taken off duty to clean the external surfaces of each boiler thoroughly. An accumulation of soot or deposit on the external surfaces reduces the transference of heat of the fuel to the boiler parts and also restricts the flow of the furnace gases, especially with modern naval boilers fitted with economisers, which are tubular feed-water heaters situated in the boiler uptake spaces and forming an integral part of the boiler. The latest developments in the maintenance of the external cleanliness of naval boilers is that of water washing, where the deposits are washed down into the furnace of the boiler and then pumped overboard. This gives a quick and very effective clean and experience tends to indicate that when combined with regular and effective use of soot-blowers this procedure may well enable the period between successive external cleaning periods to be lengthened.

NEW CONSTRUCTION MACHINERY

The efficiency of a steam plant is related to the steam pressures and temperatures at which it is designed to operate. With certain limitations the higher the pressure and temperature the greater is the possible efficiency. The "Daring" Class machinery, with steam at 650 lb/sq. inch and 850° F., which first saw service in 1952, was something of a revolution in British design of naval machinery. Up to the time that this design was adopted it had been Admiralty policy that between dockyard refits naval machinery should be so designed that it was capable of being maintained by the engine-room personnel with tools and maintenance equipment provided onboard. This policy restricted the use of special materials or manufacturing techniques which could not be reproduced onboard. The change to higher steam conditions was only possible by the adoption of special materials, such as alloy-steels, and manufacturing techniques, and therefore the existing maintenance policy had to be altered.

The emphasis has now been laid upon "repair by replacement", to cover most of the troublesome points in design. This applies not only to small components dealt with in the normal maintenance by a ship's staff but to many of the large units usually dealt with by a dockyard. This policy, however, is not intended to apply to the large group of say, numerous non-ferrous pipes and fittings which can be dealt with onboard by traditional means.

It follows that to implement this policy replace parts must be strictly interchangeable and stocks of spare parts must be either onboard or readily available and this has been arranged by the establishment of a number of Spare Parts Distribution Depots and Sub-Depots at strategic points throughout the world. Modern designs also are manufactured in many cases to finer tolerances than hitherto and to ensure interchangeability, manufacture has to be controlled by the use of accurate jigs and gauges and improved methods of measurement and dimensional inspection.

A policy of repair or maintenance by replacement is, of course, nothing new; it has been the general policy for the maintenance and repair of aircraft engines and combustion-ignition engines in the Navy for many years. In naval engineering, machinery and boilers of standard sizes were considered as far back as 1847 when Charles Atherton, the Chief Engineer of Woolwich Repair Yard, proposed to the Admiralty a scheme "for the construction of boilers in parts of an invariable size"; but the first occasion that the Admiralty tried out a policy of interchangeability of machinery parts on a considerable scale with a view to facilitating repair appears to have been the experiment of standardising the main and auxiliary machinery of the six ships of the "Duke of Edinburgh" Class designed in 1902 and completed in 1904/5; which in addition to the first of the class, the other ships were the "Black Prince", "Cochrane", "Natal", "Warrior", and "Achilles". The main engines were, of course, triple expansion reciprocating engines, and all main and auxiliary machinery parts, including main bearing frames, back and front columns, cylinders, cylinder covers and pistons, piston rods, connecting rods, glands, slide valves, slide rods, eccentrics, eccentric rods and shafting, thrust blocks and tunnel bearings as well as boiler mountings and steam pipes as far as possible were made interchangeable. In the construction of these engines some 1,800 templates and jigs were used. In 1906, C. de Grave Sells, a regular contributor to "Jane's Fighting Ships", referred to this "work of Progress", to which he added that "although its results may not be immediately apparent may possibly have a tremendous influence on the eventual result towards the end of a conflict, should the British Empire be engaged in a desperate and prolonged struggle". Now, some fifty years later, we may well ask what were the results of this experiment?

It should be recalled that by 1905 the Admiralty had decided on the adoption of the steam turbine on a large scale and it was difficult to standardise with this new form of power unit, for designs were changing rapidly. It was therefore rather late in the day to try this experiment with the triple expansion engine though in 1902 this could not be foreseen because at that time the fuel economy of this type of engine was on a par with that of the steam turbine. It was the steam turbine machinery of the "Dreadnought" (1905) with a fuel consumption of 1·52 lbs. of fuel

/S.H.P./hr. as compared with the 1·76 lbs/S.H.P./hr. of the best triple expansion engine which condemned the latter engine for high powers in warships. The full advantage of this experiment was somewhat defeated by the unfortunate loss of the "Natal" at Invergordon in 1915 and of the "Black Prince" and "Warrior" at Jutland; but while dockyard repairs may well have been facilitated by making various parts of the machinery installation interchangeable, it is thought probable that any such advantage which might have resulted in maintaining the ships' propelling machinery in a state of high efficiency between dockyard refits by the ships' personnel would have been overshadowed by the long periods required for boiler cleaning and time required for coaling ship; these ships had 26 boilers for 23,500 S.H.P. In addition, the components which would normally have been dealt with by the ships' personnel were comparatively large but were within their capabilities for repair by traditional methods. The time however to effect repairs was generally small compared with the time required to strip down a job before it could be repaired, which meant only a very small percentage of the overall time would be saved. A policy of repair by replacement is only justified either if a replace part cannot be reproduced onboard or if it can be manufactured onboard would mean a reasonable saving in the overall time required to effect repairs. To take one simple example it would be difficult to justify the manufacture, distribution, and the carrying onboard of a large number of spare brass valve spindles of different dimensions; these can quickly be manufactured onboard from stock material as occasion requires.

Repair by replacement is a costly business in the first place but with the latest types of warship machinery it is an essential part of this progress, and is being made applicable to less advanced designs where manufacture onboard would mean the employment of skilled men for a large number of hours to effect repairs by traditional means. In dockyards and repair yards this policy should lead to quicker repairs, which is an important consideration at any time but especially in war if there is likelihood of air-attack, and it should be possible to forecast more accurately the time needed to make good machinery defects. These are important aspects from the point of view of an operational planning staff which is called upon to make the best possible use of the limited number of ships at its disposal; but whatever the design of machinery or whatever form of power unit is used or will be devised for the future the duty of the Naval engineer officer and his staff will remain unchanged. To him belongs the responsibility of operating the machinery in the most efficient manner and of maintaining it at the highest possible level for as long as operational requirements demand, whether in tropical or Arctic waters.

OTHER FACTORS

Perhaps one of the most irksome jobs which falls to the lot of the engine room department is that of keeping the fuel oil tanks clean and free from sludge. In order to maintain the structural strength of a warship and its watertight subdivision many of these tanks are very confined spaces, and the work of keeping these clean represents a considerable amount in time and labour which has been worsened in recent years by ships having to use lower grade fuels, brought about by the necessary higher degree of "cracking" at the oil refineries to satisfy the world's increasing demand for motor and aviation spirit. In order to ease the work of the engine room department and to reduce the time ships have to spend in harbour, fuel-oil tank-cleaning craft are being attached to the Royal dockyards, which are capable of cleaning the tanks by mechanical means, and the operation is both quick and efficient.

The adoption of higher steam temperatures and pressures brought with them a series of troubles in trying to maintain the steam tightness of valves and pipe joints. The frequent lighting-up and manœuvring which is experienced in a warship imposes an additional stress on these fittings not normally experienced in merchant navy practice, and the work of maintaining steam pipes and fittings in an efficient state has been considerable. This work has been eased in recent years by giving more detailed attention to the design of steam pipes and fittings and expansion arrangements, adopting improved types of jointing material, and the use of special materials. The results of these changes are far-reaching for not only do they mean that a proportion of the maintenance staffs can be released for other important work and enables the machinery to be maintained at a high efficiency over a longer period, but they have also reduced the feed water losses, which means either a reduced load on the distilling plants or that a higher proportion of the output from these plants can be diverted to domestic purposes.

One of the principal factors affecting the well-being of a ship's company is an adequate supply of fresh water. Warships do not as a rule carry more than two to three days' supply of fresh water for domestic purposes, so that for long periods at sea they are dependent upon the output from the ship's distilling plant. Before the days of the distilling plant the amount of fresh water which could be carried onboard was one of the factors which limited the time ships could spend at sea, and a hundred years ago one of the amenities advertised in the sailing of a ship from England to New York was the "adult weekly allowance of 21 quarts of pure water". Some naval officers can still recall that in their early days in the Navy a tub was placed at the end of a mess table and after every member of the mess had washed in it, the contents were then used to scrub the mess table and mess deck. During the First World War right up to the late '30's the approved daily allowance of fresh water, upon which the distilling plant outputs were designed was 8–9 gallons/man. In 1937 it was increased to 13 gallons/man and by the Second World War it rose to 20 gallons/man. With the more recent amenities such as modernisation of bathrooms, the fitting of drinking water coolers and hot and cold water supply systems throughout each ship, and the installation of modern laundry equipment, even this allowance does not at times satisfy the modern sailor, whose demands have, since 1937, nearly always outstripped the design requirements of the distilling plants. While the writer does not hold entirely to one engineer's comment that "This water problem lies in the fact that it is the Engineer Officer who makes it but other people use it", there must be a reasonable limit, for fresh water production in a warship represents a considerable cost in fuel consumption, maintenance work and manpower.

In 1950 the Navy adopted the use of what is called "Admiralty Evaporator Compound", which retards the scaling of the evaporator coils, and the use of this compound combined with improved designs of coils giving a greater heating surface, are enabling the existing designs of distilling plants to maintain a high output over longer periods. Much research and experimental work is taking place at the present time with a view to producing a high-efficiency, high-output distilling plant which it is hoped will satisfy the requirements of even the next decade of sailors and reduce the maintenance work of these plants to a minimum; but maintenance work in harbour must be carried out from time to time, and if the fresh-water allowance is increased there must also be a corresponding increase in the harbour facilities for the supply of fresh water from shore hydrants for ships alongside, or from water-boats, when ships are at anchor.

HABITABILITY

The effect of change of climatic conditions upon the mind and body of a human being has been known in broad outline for centuries and was the subject of discussions of Greek origin some two thousand years ago; but detailed research in assessing the effect of different combinations of air movement and temperature, radiant heat and the humidity of the atmosphere upon the mental and physical capabilities of man are of recent origin, and much research work of this nature is being carried out today. Operational service in warships, working in cramped compartments, closing up between normal watches for "action stations", with hatches and watertight doors closed for defence purposes, after a time affect the bodily and mental efficiency of those onboard. For the European if this is also associated with a rise of temperature and humidity, due to climatic or other conditions, above those to which he is normally accustomed, this falling off in efficiency is more rapid, and under severe conditions of temperature and humidity, such as have sometimes been experienced in engine room compartments, may reach a state of complete mental and physical exhaustion.

It is widely recognised that there is a general level of temperature, humidity and air movement, in which the European can maintain his highest efficiency over long periods, and much has been done in the last ten years to improve the working conditions of specialised men in warships by fitting air-conditioning plants to selected spaces, e.g. to the operations rooms, gunnery control compartments, switchboard rooms, and wireless transmitting and receiving rooms, but all these are comparatively small spaces. The large engine-room compartments of a warship present a much more difficult problem to make them more habitable. Not only are they subject to changes in climatic conditions, but there is the additional effect of radiant heat from boilers, steam pipes and machinery, and humidity and temperature are also increased by any leakage of steam or water into the compartments, e.g. from turbine or valve glands and open drains. Improvements in the working conditions in the engine and boiler rooms have, however, been brought about in recent years by giving more attention to the ventilation air supply, distribution, and exhaust, fitting vapour suppressors to turbine glands and installing closed drain systems, thus reducing the amount of steam leaking into the compartments, adopting improved lagging for steam pipes and machinery, and fitting air casings to boilers to reduce the amount of radiant heat; but there is a long way to go before the conditions can approach the general level where the European can maintain his efficiency over very long periods in tropical conditions. Experiments have been carried out in some foreign warships of fitting air coolers in the discharge trunking from the engine room supply fans, but this occupies considerable weight and space. Perhaps the best solution might be found in devising some means of fitting the controls outside the major machinery compartments.

OPERATIONAL PLANNING

To obtain the maximum use of the various ships of a Fleet for operational service so as to avoid taxing the machinery and equipment beyond its limit of reliability and efficiency and ship's personnel beyond endurance is a job which calls for a thorough understanding of all the factors involved. Between dockyard refits no longer is operational planning dictated by the necessity of having to allow frequent internal boiler cleaning periods, but it does more than ever before call for a co-operative effort where the engineering, gunnery, electrical and hull maintenance and ship storing requirements and personnel needs are carefully co-ordinated. In a United Nations naval force there is the problem of varying types of ships, machinery and equipment, and the complication of different methods of recruitment of personnel, lengths of commissions, and periods between dockyard refits. If the present trend of events continues in increasing the reliability of machinery and equipment and shortening the time taken to carry out essential maintenance and repairs, it may be that the principal factor in planning the maximum use of warships at sea in any possible future conflict will be that of maintaining the morale, efficiency and well-being of the ships' personnel.

A. FUNGE SMITH

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REFERENCE SECTION

STATEMENT ON DEFENCE
(Cmd. 9075)

I.—INTRODUCTION

1. In the Statement on Defence, 1953 (Cmd. 8768), Her Majesty's Government set out the results of their review of defence policy and the rearmament programme so far as they affected the financial year 1953–54. That Statement emphasised that the Government, having regard to the responsibilities of the United Kingdom as a member of both the Commonwealth and the North Atlantic Treaty Organisation, would continue to the utmost of their capabilites to strengthen the defences of the United Kingdom, of the North Atlantic Treaty area with which the defence of these islands is indissolubly linked, and of the whole free world. It went on to explain that on economic grounds some check on the rapidly rising rate of expenditure on rearmament had necessarily been imposed and the programme spread over a longer period and held to a lower peak.

2. In this introduction to the Statement on Defence, 1954, the Government set forth certain broad conclusions on the level of defence expenditure and the size and shape of the armed forces during the next few years.

3. During the past year there has been some alleviation of international tension. The Government will wholeheartedly co-operate in all genuine efforts to achieve further improvement. The alleviation of tension has been assisted by the growing deterrent to aggression offered by the forces of the free world. As the Prime Minister has said "this would be a most fatal moment for the free nations to relax their comradeship and preparations. To fail to maintain our defence effort up to the limit of our strength would be to paralyse every beneficial tendency towards peace both in Europe and in Asia."

4. While the Government will work for a further improvement in international relations, the long-term aims of World Communism appear to be unaltered. In the Far East fighting continues in Malaya and Indo-China. It is clear that one of the principal Soviet aims is to weaken the strength and cohesion of the Atlantic Alliance.

5. It is therefore essential that we, our Commonwealth partners and our allies should continue to build up our armed strength to the maximum of our ability. Provided that our defence effort is maintained, and that we continue to conduct our diplomacy with patience and resolution, it is the Government's view that the continuation for a long period of the present state of cold war is now more likely than the outbreak of a major war on any particular date.

6. The Government accordingly propose to continue the policy foreshadowed last year and for the next few years to maintain our defence effort at the maximum which our economic capabilities permit. This accords with the policy accepted by the North Atlantic Council at its meeting last December in Paris, when all member Governments agreed that they would, so far as political and economic considerations allowed, maintain their present defence efforts.

7. Defence will thus continue to impose a heavy burden on our economy in terms both of the budget and the balance of payments. In particular, the task of expanding our exports still further will not be eased by the continuing need to devote to defence production a substantial part of the output of our engineering industry. Given the prospect before us, it is essential that we should maintain and strengthen the soundness of our economy. It will, therefore, continue to be necessary to hold a careful balance between the demands of defence and those of other sectors of the economy and, in particular, to ensure by close co-operation with our partners that our share of the common burden does not impose an undue strain on our balance of payments. Our armed forces cannot, in these circumstances, be provided with all those things which ideally they should have. It will, however, be the Government's aim to increase their efficiency progressively and to take advantage of all new developments which appear likely to increase fighting strength and to promote economy of effort.

8. The application of such a policy must clearly be carefully related to the principal aims of the country's defence programme. These can be briefly expressed as follows.

9. First, we must maintain our resistance to World Communism and to Communist adventures and discharge our other peace-time obligations overseas. Secondly, we must, with our allies, build up the most effective possible deterrent against a major aggression which would lead to global war. Thirdly, we must do all we can, within the limits of our resources, to be prepared to meet such an aggression should our efforts to prevent it fail.

10. In the cold war, World Communism has great advantages. It is a dictatorship and can, therefore, direct every activity towards a single end. It is able to fight by proxy and, by taking the initiative, has made us disperse our forces in remote and inconvenient places. We must continue to deal with the situations thus created. In addition, we have to meet our world-wide commitments as a Colonial Power. These have been increased by the need to provide forces to assist the civil power in maintaining internal security in the Colonies. This has imposed new commitments, mainly on the Army, for example in Kenya and in British Guiana.

11. Our forces in Europe and in other strategic areas overseas, steadily strengthened by the rearmament programme begun in 1950, form, with the forces of our allies, a strong and growing deterrent to aggression. The Government will continue to regard it as a defence measure of the first importance to maintain the strength and efficiency of the British forces on the Continent assigned to the Supreme Allied Commander, Europe. The primary deterrent, however, remains the atomic bomb and the ability of the highly organised and trained United States strategic air power to use it. From our past experience and current knowledge we have a significant contribution to make both to the technical and to the tactical development of strategic air power. We intend as soon as possible to build up in the Royal Air Force a force of modern bombers capable of using the atomic weapon to the fullest effect. A strong and efficient force of medium bombers is of the greatest importance to us both for our own security and for the defence of Western Europe.

12. As the deterrent continues to grow, it should have an increasing effect upon the cold war by making less likely such adventures on the part of the Communist world as their aggression in Korea. This should be of benefit to us by enabling us to reduce the great dispersal of effort which the existing international tension has hitherto imposed upon us.

13. In considering what preparations should be made to meet the contingencies of global war, we must have in mind not only the limits of our resources but also the probable nature of such a war. Both the free world and the Communist world have the atomic bomb, though the free world holds the superiority in this respect. If, by some miscalculation in Communist policy or by deliberate design, a global war were to be forced upon us, it must be assumed that atomic weapons would be employed by both sides. In this event, it seems likely that such a war would begin with a period of intense atomic attacks lasting a relatively short time but inflicting great destruction and damage. If no decisive result were reached in this opening phase, hostilities would decline in intensity, though perhaps less so at sea than elsewhere, and a period of "broken-backed" warfare would follow, during which the opposing sides would seek to recover their strength, carrying on the struggle in the meantime as best they might. Such a prospect emphasises yet again the prime necessity of basing our defence policy upon the prevention of war. It also makes clear the need to keep the lead which we now hold in technical development on which we must rely to offset the preponderance of the Communist States in manpower. Our active forces must be able to withstand the initial shock. Our reserve forces must be capable of rapid mobilisation behind the shield which our active forces provide and be ready to perform their combat tasks at the earliest possible moment.

14. These three tasks—defence in the cold war and discharge of our peace-time obligations, building up the deterrent, and preparations against the contingencies of global war—are at once overlapping and conflicting. Many of our forces are at present tied down in areas remote from their war stations, and our overseas commitments have made it impossible for us to maintain an adequate army strategic reserve in this country. However, many of our forces overseas are playing an important part as a deterrent to aggression, as also are our preparations against the contingencies of global war. The Navy has its world-wide tasks. The Army has to bear the main burden in the cold war, though both the Royal Navy and the Royal Air Force have their parts to play in it. The Air Force has the major deterrent rôle. None of the Services can be reduced in size or efficiency to such a point that it would cease to make an effective contribution to the deterrent or to provide a sound basis for mobilisation.

15. To the problems created by such overlaps and conflicts between the various tasks of the armed forces must be added that of the effect of new and unconventional weapons, particularly atomic weapons and guided missiles. Atomic weapons are in production in this country and delivery to the forces has begun. Guided missiles have reached an advanced stage of development: an air-to-air weapon will be the first to come into service and surface-to-air weapons will follow. During the past year much attention has been paid, both in the United Kingdom and in the North Atlantic Treaty Organisation, to the problems of tactics and training which the advent of new weapons will create and to their effect upon the size and

shape of the forces. It is our hope that these studies will gain in realism and effectiveness as the result of the request which the President of the United States has made to the Congress for legislation making possible the release of more information on the use and effects of nuclear weapons. But many of the weapons are still in the development stage and, taking them as a whole, not enough is generally known about their effect on operations for any definite views to be formulated. It will be some years yet before we have enough of these new weapons to bring about any very radical modification in the pattern of the United Kingdom defence effort. They will, however, begin to have their effect in increasing the fighting power of our forces and in making them better able to meet those tasks in a major war for which they cannot at present be regarded as adequate. In the longer term, too, we shall continue to need conventional forces to deal with the kind of cold war operations, falling short of a major war, in which our forces are now engaged. And even in a major war it does not seem likely that the possession of new weapons will make it any less necessary to keep a firm screen of troops on the ground and of aircraft to withstand the first shock of an attack, to hold the enemy until mobilisation is completed and to exploit and consolidate the tactical situations which the new weapons will create. Clearly, within a limited budget, we may not be able to afford both new weapons and conventional forces of the present size. But the balance between the two can only be decided in the light of the situation as it develops over the years ahead. The new weapons can in any event only be introduced gradually as they become available.

16. With all these considerations in mind, the Government have concluded that a gradual change should be brought in the direction an balance of our defence effort. Still greater emphasis will have to be placed on the Royal Air Force because of the need to build up a strategic bomber force and because of the importance of guided missiles in air defence. For reasons explained in later sections of this paper, this emphasis will take time to reveal itself in increased allocations of funds to the Air Ministry. Defence research and development will continue to have high priority, and expenditure on it will increase, though this will be kept within bounds by concentration on projects of the highest importance. Expenditure on the Army will tend to decline, though the extent of the decline will to a large extent depend upon the commitments which the Army, as an instrument of Government policy, has to meet. Subject to these commitments and to our obligations to our allies, it will be our aim gradually to reduce the total size of the Army and to reconstitute the strategic reserve at home, the lack of which is at present a serious, though unavoidable, defect in our defence readiness. The necessity for the proper defence of our sea communications makes it unlikely that expenditure on the Royal Navy can be reduced much below its present level. As a general principle, because of the less immediate danger of a global war and because of the Government's appreciation of the probable nature of such a war, rather less emphasis will be placed on the accumulation of reserves of warlike stores and equipment for a prolonged period of hostilities.

17. This general policy will manifest itself in the following broad programmes for the Services:

(*a*) The Royal Navy will continue to concentrate on building up and modernising its anti-submarine and anti-mine forces and on the completion of aircraft carriers now under construction. These carriers will be fitted with the angled deck which will enable them to operate efficiently high performance naval aircraft.

(*b*) The number of front-line formations in the active Army will, within the limits imposed by our overseas commitments and our obligations to our allies, be somewhat reduced. This will be accompanied by a more than proportionate reduction in administrative and supporting units. At the same time the aim will be to build up a strategic reserve at home, thus incidentally bringing the proportions of home and overseas service into better balance. The process of re-equipping the active Army will continue. The re-equipment programme for the reserve Army will be concentrated on those formations which would be the first to be mobilised and to go into action.

(*c*) The Royal Air Force will concentrate on modernisation and expansion in the United Kingdom and Western Europe, while maintaining forces of high quality in the Middle East and the Far East. The jet medium bomber squadrons will be built up as early as production allows with the aim of providing a highly trained and flexible force for the exercise of air power.

18. The Government's review of defence policy has naturally included the Civil Defence programme. Their broad conclusions, which have already been explained to the House of Commons by the Home Secretary, are summarised in Section VII of this Statement which also includes a review of progress during the past year.

II.—FINANCE

19. The total Defence estimates for 1954–55 amount to £1,639·90 million. This compares with a total of £1,636·76 million planned for 1953–54. Actual expenditure in 1953–54 is, however, likely to prove less than was originally estimated.

20. This underspending is due to a variety of reasons which have affected the Royal Air Force in particular. One of the major causes was the considerable adjustment, by way of rephasing or elimination, which had to be made in the production and works programmes as a result of the review foreshadowed in last year's Statement on Defence. Another cause has been the short-fall in deliveries of aircraft and their associated equipment (see paragraph 53). Continued difficulties over the United Kingdom's contribution in kind to the 1952 Infrastructure programme have made it impossible to spend all the money voted for this purpose in the current financial year. Though some of these factors continue to cause uncertainty, they have all been taken as fully as possible into account in preparing the estimates for 1954–55.

21. *American Aid.*—The figure of £1,639·90 million in paragraph 19 above includes provision for expenditure in 1954–55 representing £85·36 million of the sterling equivalent of aid from the United States of America. There are three types of United States aid contributing to this total. The first, accounting for £34 million of the £85·36 million, is the sterling counterpart of defence support aid which, by agreement with the United

States Government, is appropriated in aid of expenditure on the production of equipment for the Services. The nature of this counterpart and the effect of its appropriation in aid of Service Votes were explained in the Statement on Defence, 1952. The sum of £34 million represents the sterling counterpart (less the deduction of 10 per cent. which it has been agreed should be set aside for the use of the United States Government) expected to accrue in 1954–55 from defence support dollar aid allotted to the United Kingdom for the United States fiscal year ending on June 30, 1954, and the sterling counterpart (less a similar deduction) of dollar aid received or to be received under earlier United States appropriations but not previously brought to account. The second element in the £85·36 million is £21 million of sterling to be received by the United States Government from the sale of agricultural commodities. The United States Government is contributing this sum in aid of expenditure on the production of equipment for the Services in 1954–55. The remaining element, amounting to £30·36 million of the £85·36 million, represents the sterling equivalent of special dollar payments by the United States Government in respect of military aircraft manufactured in the United Kingdom and required by the United Kingdom Forces for the defence of the North Atlantic area.

22. The total of £85·36 million has been allotted as follows:

	£ million			
	Navy	*Army*	*Air Force*	*Total*
Defence Support Aid	8	16	10	34
Agricultural Commodity Aid ..	6	10	5	21
Special Aircraft Purchase ..	Nil	Nil	30·36	30·36
Total	14	26	45·36	85·36

23. *Summary of Estimates*, 1954–55.—The following tables compare the estimates for 1954–55 with the corresponding figures for 1953–54. An analysis of the 1954–55 figures is provided in Annex II.

NOT ALLOWING FOR RECEIPTS FROM AMERICAN AID

	£ million	
	Estimate 1953–54	*Estimate* 1954–55
Admiralty	364·50	367·00
War Office	581·00	561·00
Air Ministry	548·00	537·00
Ministry of Supply	123·75	151·00
Ministry of Defence ..	19·51	23·90
	1,636·76	1,639·90

ALLOWING FOR RECEIPTS FROM AMERICAN AID

	£ million *Estimate* 1953–54	 *Estimate* 1954–55
Admiralty	329·50	353·00
War Office	526·00	535·00
Air Ministry	498·00	491·64
Ministry of Supply	123·75	151·00
Ministry of Defence ..	19·51	23·90
	1,496·76	1,554·54

24. *Atomic Weapons.*—As explained in Cmd. 8986 (The Future Organisation of the United Kingdom Atomic Energy Project) and subject to the necessary legislation, the Minister of Defence will remain generally responsible, after the Atomic Energy Authority is set up, for the allocation of resources available for defence purposes between atomic weapons and conventional arms. Subject to the Minister of Defence's responsibility for general policy, the Minister of Supply will be responsible for the provision to the Services of complete atomic weapons and will place contracts with the Authority for the production of their nuclear components and for research and development in relation to these weapons. The Admiralty will deal direct with the Authority on matters affecting the nuclear propulsion of ships. Broadly similar relationships will obtain between the Ministry of Supply, the Service Departments and the Department of Atomic Energy under the Lord President of the Council in the interim period from January 1, 1954, before the Authority is set up. The figures for 1954–55 in paragraph 23 include for the first time the estimated cost to the Service Departments of atomic weapons to be delivered to them in that year and to the Ministry of Supply of atomic weapon research and development.

III.—MANPOWER

ACTIVE FORCES

25. *Regular Recruitment.*—The following table gives the number of male regular recruits entered in each Service in each of the years 1950–53 and the number which it is estimated will be entered in 1954:

MALE REGULAR RECRUITS

	Actual 1950	 1951	 1952	 1953	*Estimated* 1954
Navy	10,000	10,500	10,300	9,300	9,000
Army	25,300	26,400	53,200	42,700	40,000
R.A.F. ..	23,600	44,900	39,800	31,600	31,000
Total ..	58,900	81,800	103,300	83,600	80,000

26. *Strength of the Regular Forces.*—The last of the regulars retained by the Army and Royal Air Force as a result of the Korean emergency have been released. All regulars retained by the Navy beyond the normal period of colour service will have been released by the end of March, 1954. By the same date the Navy will also have released all the Royal Fleet Reservists recalled to the colours. The following table compares the actual male regular strengths of officers and other ranks at April, 1952, and April, 1953, with corresponding estimated strengths at April, 1954, and April, 1955.

MALE REGULAR STRENGTH

(Officers and Other Ranks—Thousands)

	Actual		*Estimated*	
	April 1, 1952	*April* 1, 1953	*April* 1, 1954	*April* 1, 1955
Navy	135·5	133·7	121·7	119·2
Army	214·8	211·3	220·1	226·4
R.A.F.	171·5	188·9	187·7	191·2
Total	521·8	533·9	529·5	536·8

27. Although the figures in the table in the preceding paragraph indicate that the regular strengths are expected to be maintained, and even slightly increased, in the coming financial year, there are certain aspects of this question which are disquieting.

28. As the table in paragraph 25 indicates, each of the three Services has suffered an appreciable decline in regular recruiting in 1953, as compared with the previous year. Recruiting to the Navy on medium and long-term engagements (the Navy offers no short-term engagement) did not come up to expectations. In the Army and Royal Air Force the majority of regular recruits continued to come from men otherwise due for call-up for national service, and the fact that the number called up in 1953 was smaller than in the previous year contributed to the drop in regular recruiting. Engagements for three years in the Army numbered 22,250 in 1953, compared with 41,000 in the previous year. On the other hand, about 17,000 men enlisted in the Army on the new engagement for 22 years, with a right to leave at each three-year point: the number in 1952 was 5,700. In the Royal Air Force, recruiting on long-term engagements continued to be inadequate. About 15,000 men undertook the short three-year engagement, compared with 22,000 in 1952. Enlistments on four-year engagements remained much the same, at about 5,000.

29. But it is not sufficient simply to maintain a reasonable level of regular recruiting. The core of any Armed Service must be the medium and long-term regulars. Now that the Army and Royal Air Force are obtaining so many of their recruits on an initial three-year regular engagement, it is important to ensure that a reasonable proportion of these regular recruits prolong their service. It is here that the Services are faced with their main difficulties at the present time. In the Navy, large numbers of ratings who entered on seven-year engagements soon after the war are now becoming due for release, and the indications are that not many of

these men will decide to stay in the Service. In the Army, extensions of service in 1953 were slightly better than in 1952 but still well below the required rate. Re-engagements declined in 1953 compared with 1952. In the Royal Air Force there was some improvement, but among the men on three-year engagements not more than 3 per cent. are at present prolonging their service.

30. There will have to be an improvement in all three Services in the numbers of men prolonging their current engagements if the increasing shortage of N.C.O.s and skilled tradesmen is to be made good and the operational mobility and technical efficiency of the Services maintained. Inducements to men to prolong their service will be continued in 1954.

31. *National Service Requirements.*—There will be four registrations in 1954–55 as in 1953–54. The number of men estimated to be available for call-up is 199,000. These will be allocated to the Services as follows:

Navy	9,000
Army	126,000
R.A.F.	60,000

This allocation includes those who are expected to enter the forces on regular engagements in lieu of performing national service. The small margin of about 4,000 will help to spread the call-up evenly over the year and will provide a reserve against changes in requirements.

32. *Total Size of Active Forces.*—During 1954–55 the total active strengths of the Navy and Air Force are expected to remain broadly constant; that of the Army is expected to decrease by about 13,000. The expected increase of about 6,000 in the number of regulars in the Army will be offset by a reduction of some 19,000 national servicemen. Allowing for this reduction the total estimated strength of the active forces at April 1, 1955, will be about 844,000. The actual strength at April 1, 1953, is compared with the estimated strengths at April 1, 1954, and April 1, 1955, in the following table. A detailed analysis is given in Table 1 of Annex I.

TOTAL ACTIVE STRENGTH

(Thousands)

	Actual	*Estimated*	
	April 1, 1953	*April* 1, 1954	*April* 1, 1955
Regulars	533·9	529·5	536·8
National Service ..	312·8	302·1	283·5
Women	24·4	23·9	24·0
Total	871·1	855·5	844·3

33. *Civilian Manpower.*—The figures quoted in the above table relate only to uniformed personnel and exclude civilians directly employed by the Service and Supply Departments. It is expected that in 1954–55 the numbers so employed will remain roughly the same as in 1953–54.

RESERVE AND AUXILIARY FORCES

34. *Recruitment and Strength.*—The size of the reserve and auxiliary forces including the national service reserve continued to increase during 1953 from 427,000 on January 1, 1953, to some 571,000 on January 1, 1954. These figures are analysed at Table 2 of Annex I. The number of national service reservists serving in the reserve and auxiliary forces, which at January 1, 1953, was nearly 307,000, increased by January 1, 1954, to about 457,000.

35. During 1953 the number of volunteers in the Navy and Air Force reserves has remained broadly constant. In the Army, however, in spite of an improvement by about 15 per cent. in the number of volunteers in the Army Emergency Reserve, there has been an overall decrease of about 7 per cent., mainly because of the heavy loss from the Territorial Army of men who joined it soon after its reconstitution and who have not renewed their engagements. On the other hand, the number of national service reservists serving on voluntary reserve engagements in the reserve and auxiliary forces increased substantially during 1953, and this represents an encouraging development. Although the proportion of such volunteers in the Navy and Air Force is still small, about 30 per cent. of the national service reservists who had passed into the Territorial Army by the end of 1953 had taken on voluntary engagements. There is a continuing and increasing need in all three Services for national service reservists to undertake such voluntary engagements. Moreover, it is important that they should continue to re-engage for further service as volunteers to replace the older men who will be coming to the end of their engagements and so help to maintain the strong volunteer nucleus upon which the efficiency of the reserve forces so greatly depends.

36. *Training of National Service Reservists.*—It is the policy of the Admiralty and War Office to ensure that all their national service reservists, with few exceptions, receive training during their period of reserve service. In the Royal Air Force, however, the number trained is limited since it is Air Ministry policy, for reasons of organisation and finance, to restrict annual training to national service reservists who will be required immediately on mobilisation and who have been out of the Service long enough to need refresher training.

FUTURE OF THE NATIONAL SERVICE SCHEME

37. The present national service scheme has been extended by Order in Council for another five years. The period of whole-time national service remains at 24 months, though the Government will keep under review the possibility of shortening the period, should circumstances permit.

NAVY, ARMY AND AIR FORCE RESERVES ACT

38. The Navy, Army and Air Force Reserves Act, which gives effect to various measures for strengthening the reserves, has been passed by Parliament.

HOME DEFENCE MEASURES

39. Steps to strengthen our active defences have continued during 1953. They include:

(i) *Organisation and Training of Mobile Columns in Service Establishments.*—Naval establishments in the United Kingdom have carried out training and tactical exercises. All Home Commands of the Army have carried out large-scale exercises with mobile columns, in some cases in co-operation with the Home Guard, Civil Defence Corps and Police. In the Royal Air Force progress in training station personnel in defence rôles has continued with regular station exercises in all Commands. Home Base establishments of all three Services have also carried out inter-service exercises.

(ii) *Home Guard.*—Recruitment continued steadily, if slowly, during 1953. Over 34,000 officers and men were enrolled by January 1, 1954, and an additional 28,000 officers and men were on the reserve roll for enrolment in an emergency. The organisation of the Home Guard has been further developed to provide for the formation of special sub-units within certain static service installations and industrial concerns. All Home Guard battalions have received tactical training and most of them have carried out local defence exercises.

(iii) *Royal Naval Mine-watching Service and Royal Observer Corps.*—Recruitment to the Royal Naval Mine-watching Service has continued steadily since it was inaugurated in 1952 and regular instruction is now being given at nearly a hundred training centres. Minewatchers have taken part in a number of exercises. A complete geographical reorganisation of the Royal Observer Corps has taken place during 1953, and it has been extended to Northern Ireland. The Corps took an active part in 1953 in several air exercises. The enrolled strength of the Royal Naval Mine-watching Service is about 3,600, whilst that of the Royal Observer Corps remains at about 18,000.

MEDICAL SERVICES

40. The problem of maintaining the high standard of medical care of the armed forces has given rise to concern because of the continuing decline in the numbers of applicants for regular commissions as medical and dental officers. The Government have accordingly set up a small independent Committee, under the chairmanship of Lord Waverley, with the following terms of reference:

> " To review the arrangements for providing medical and dental services for the armed forces at home and abroad in peace and war, and to make recommendations."

41. Meanwhile certain interim measures designed to stimulate recruiting in the Services medical branches have been introduced.

COLONIAL FORCES

42. There are about 65,000 men in Naval, Army, and Air Force Units of the Colonial Forces today. In addition, there are about 14,000 men

locally enlisted in the colonies serving with United Kingdom units. East African and Mauritian Pioneers are amongst the troops serving in the Middle East, whilst in the Far East a battalion of the King's African Rifles and a battalion of the Fiji Regiment are serving in Malaya. There are about 4,500 British officers and other ranks serving in locally-recruited Colonial Forces to provide the necessary leadership, instruction and administration.

IV.—PRODUCTION, RESEARCH AND DEVELOPMENT

PRODUCTION

43. About £650 million was provided in estimates for defence production in 1953–54. About the same figure is provided for 1954–55. There will be no major changes in the character of the production programmes of any of the three Services during 1954–55. The more important features of the programmes are described in paragraphs 46 to 54.

44. *Offshore Procurement.*—During the past year further contracts have been entered into under the offshore procurement programme for the purchase by the United States of military equipment produced in this country for the use of N.A.T.O. countries, including the United Kingdom. Up to the end of 1953, the total value of orders placed by the United States amounted to some $450 million. This was made up largely of orders for aircraft (Hunters and Seahawks), ammunition, Centurion tanks, electronic equipment and minesweepers. Orders of this magnitude make a valuable contribution towards improving the balance of payments and strengthening our war potential, as well as enabling the United Kingdom to play an effective part in equipping the forces of the N.A.T.O. countries and promoting standardisation. It is hoped that as a result of current discussions further orders will be placed in the United Kingdom.

45. *Labour.*—As forecast a year ago, the changes in the defence programme have not caused redundancy on any large scale. The export of aircraft, particularly in the form of offshore procurement by the United States, helped to maintain production in the aircraft industry. The labour force in the industry expanded from 206,000 in December, 1952, to 227,000 at the end of November, 1953. More skilled labour is still required: some firms will need to add considerably to their labour force during 1954. The Royal Dockyards will continue to be fully employed on the programme of repairs, refits, modernisations and conversions. The number of workpeople will be slightly increased and still large numbers of skilled men could be absorbed if they were available.

MAIN FEATURES OF THE 1954–55 PRODUCTION PROGRAMMES

46. *Navy.*—The naval production programme is proceeding at about the level planned in 1953–54.

47. In new construction the emphasis remains on the building of minesweepers and anti-submarine vessels and on completing the aircraft carriers under construction. The minesweeping programme suffered some setbacks during the past year, arising from the difficulties normally experienced with new types of ships, but by the end of 1954–55 over 100 should be completed. Three of the aircraft carriers at present under construction are expected to be completed during 1954–55, each with an angled flight deck. The steam catapult and improved arresting gear will also come into

service. The first of the frigates of the latest type ordered under the rearmament programme will be completed during the year. A number of submarines are being laid down.

48. A new feature of the modernisation and conversion programme will be the introduction of the angled deck in aircraft carriers. Otherwise the emphasis remains on the conversion of destroyers to anti-submarine frigates. The modernisation of cruisers and destroyers with improved armament will continue.

49. There will be a substantial provision of aircraft for the Fleet Air Arm. The development and introduction of helicopters for naval work is proceeding.

50. No substantial addition will be made to mobilisation equipment and war reserve stocks of stores and ammunition but the balance of items within existing stocks will be improved.

51. *Army.*—Apart from a substantial decrease in the amounts provided for maintenance of equipment and ammunition for current use, resulting mainly from the cessation of hostilities in Korea, there is no major change of emphasis in the production programme which constitutes a further instalment of Army re-equipment and rearmament under the long-term plan. As previously, the largest individual items of expenditure are in respect of vehicles, ammunition, clothing, and general stores. Considerable progress has already been made in the provision of combat vehicles, but it is now becoming necessary to replace the older of the technical vehicles and load carriers at present in use.

52. *Royal Air Force.*—As in 1953–54 the production programme continues to concentrate effort upon the more modern and advanced types of equipment. Aircraft again form the largest single item and the provision has been increased to £156 million. Over four-fifths of the money will be spent on jet-engined aircraft and over half of it on bombers and swept-wing fighters.

53. In the past year, as previously announced, certain cuts have been made in the earlier programme. Aircraft of the types already in service were delivered to the Royal Air Force at approximately the rates forecast but there were some delays in commencing delivery of the new and more advanced types of aircraft and their associated equipment. These were caused primarily by technical difficulties in development and design which emerged in the later stages of development and flight testing and led to the holding up of clearance of the aircraft for service use.

54. The programme for armament and explosives makes increased provision for newer and improved types of aircraft guns, ammunition and bombs and a smaller provision for the less modern types. Larger quantities of the new types of airborne radio and radar equipment will be delivered. The first stage of the expansion and modernisation of the radar network in the United Kingdom will be completed and similar work overseas will be continued.

Military Aid from the United States and Canada

55. Deliveries of military equipment supplied to the United Kingdom by the United States under the Mutual Security Act continued throughout the past year. Spare parts for the maintenance of equipment already held by our forces have continued to figure largely in the deliveries. Complete

equipments received have included fighter and anti-submarine aircraft, helicopters, radio, radar and engineering equipment, vehicles, and ammunition. Some of the equipment was manufactured in the United Kingdom and financed by the United States under the offshore procurement programme.

56. Further deliveries will be made during the coming year. Discussions are proceeding with the United States authorities on further allocations of equipment. It seems probable that future allocations to the Royal Navy and the Army will consist largely of spare parts and maintenance equipment. It is hoped that the United States will be prepared to continue their assistance to the Royal Air Force in the form of aircraft and other equipment purchased in the United Kingdom under offshore procurement arrangements.

57. The delivery of F. 86 (Sabre) jet aircraft to the Royal Air Force is virtually completed. This was a joint Canadian/United States project. In the main the airframes were produced and financed by Canada and the engines and ancillary equipment were provided by the United States. Further deliveries of radar equipment and other material were received from Canada and will be continued throughout the next year.

RESEARCH AND DEVELOPMENT

58. It is probable that at no previous time have the Defence Services been faced with decisions of such extreme difficulty as they are today in the field of research and development. Scientific research has opened the way to the development of new weapons of enormously increased effect. These weapons are extremely complicated and involve the development of entirely new techniques before success in laboratory experiments can be transformed into practical weapons for Service use. The time taken, therefore, to put these new weapons through all the various stages of research, development and production tends to be very much longer than in the past. What is more, the weapons themselves are extremely expensive and the cost progressively increases as the process of development continues.

59. The problem facing the Defence Services in these circumstances is how best to divide available funds between, on the one hand, improvements, and possibly major improvements, in current weapons and equipment and, on the other hand, research and development on these new weapons. For the peaceful nations this decision is an extremely difficult one because, if they decide to concentrate on short-term improvements, not only is there a risk that much of their money will be wasted, but the time taken to reach the stage at which the forces can be equipped with the new weapons is seriously lengthened. If, on the other hand, they decide to concentrate all their efforts on re-equipment with the new weapons, their defences will be so much the weaker should war come before the new weapons are available.

60. This kind of problem has always faced the Defence Services of a peaceful nation. It is, however, at the present time gravely aggravated by the enormous cost of these new devices and by the speed of scientific advance. For example, the time may well come when, for certain purposes at any rate, the manned aircraft will be superseded by the guided weapon, but we are not yet in a position to say when that may be and we cannot

therefore ignore the necessity for dealing, for instance, with hostile bombers capable of flying at great heights and at speeds approaching that of sound. To deal with this threat with the fighter demands a proper fighting machine whose speed well exceeds that of sound. We have in fact made good progress in this direction and we have reasonable hope that a research aircraft will fly within the next twelve months. The new fighters now being introduced into the Royal Air Force will in due course be equipped with powerful air-to-air guided weapons which will increase their lethality by perhaps four times. The development of surface-to-air guided weapons is also making good progress.

61. All these developments are being supported by continual improvements in our arrangements for detecting incoming enemy aircraft and in our Control and Reporting system generally. Our defence plan is so designed as to permit these new developments to be introduced and phased into the existing system as they can be made available.

62. In the land battle, the effects of our research and development policy will be rather to improve the ability of the ground forces to carry out their tasks than to make it possible to reduce numerical strength. These effects are already beginning to be felt and as new weapons come increasingly into service, so will our ability to withstand attack on land be progressively increased.

63. At sea, the introduction of the already known British inventions, the steam catapult and angled deck, will make it possible to operate much higher performance aircraft from our aircraft carriers. Work on these devices is well advanced and these developments, together with the great improvements in our methods of anti-submarine detection and in naval weapons generally, will greatly increase the ability of the Navy to carry out its main function of controlling sea communications.

64. To sum up, our policy must in some respects be a compromise. We cannot neglect our short-term needs and put all our efforts into what has been described as press button warfare. Moreover, the balance as between long term and short term is always changing. It is useless to have a static programme. We shall in 1954–55 be spending nearly £160 million on defence research and development. This is a very large sum and of itself indicates the great importance which the Government attach to ensuring that our forces are, and will continue to be, equipped with weapons of the most modern character.

V.—WORKS SERVICES

65. Expenditure on works services is estimated at £154 million, compared with the estimate of £171 million in 1953–54.

66. The main features in the programme continue to be the modernisation and improvement of airfields, the provision of covered storage, and work on the air defence system and at research and development establishments.

67. The Admiralty intend to accelerate the modernisation of plant and buildings in the Royal Dockyards which should lead to valuable improvements in productive capacity.

68. The Army are starting a long-term programme at home of modernising barracks and of replacing those past redemption, and war-time hutted camps, with permanent buildings.

69. The Air Ministry will continue the programme of works services for United States Air Force units stationed in this country, towards which the United States Government are making a substantial financial contribution.

70. The Armed Forces (Housing Loans) Act, 1953, increased by £35 million the amount of money available to the Services for providing married quarters in the United Kingdom and extended by five years the time within which it can be spent. It is expected that over 3,900 quarters will be completed during the current financial year making a total of 16,500 since April 1, 1950. It is expected that a further 3,900 will be completed and 4,300 started in 1954–55.

VI.—CO-OPERATION WITHIN THE COMMONWEALTH AND WITH THE NORTH ATLANTIC TREATY ORGANISATION

COMMONWEALTH

71. Close co-operation continues between the United Kingdom and the other Commonwealth countries in all aspects of defence. The achievements of the First (Commonwealth) Division and of the Commonwealth naval and air units in the Korean theatre of operations during the early part of 1953 provide an outstanding example. Units from other Commonwealth countries have also continued to serve alongside the United Kingdom forces in Malaya and the Middle East.

72. There have been further meetings in 1953 of the military staffs of the United Kingdom, Australia, and New Zealand to consider defence problems in the Pacific and Far East. As a consequence of discussions during the meeting of Prime Ministers in June, the Chief of the Imperial General Staff visited Australia and New Zealand in the autumn, in order to have talks with their Chiefs of Staff on defence policy and strategy in the area. The Chief of the Imperial General Staff also visited Canada and the First Sea Lord visted India and Pakistan.

73. An important part of Commonwealth defence co-operation is the continued exchange of personnel and information between the various Commonwealth countries. Much of this is carried out through day-to-day consultations by military liaison staffs in London and the other Commonwealth capitals. A successful meeting of the Commonwealth Advisory Committee on Defence Science was held in New Delhi in March, 1953. Canada continues her valuable help in training Royal Air Force pilots and navigators and Royal Navy observers. Australia collaborates closely with the United Kingdom in the testing of weapons on the range which she has established for this purpose at Woomera and is thus making an outstanding contribution to Commonwealth security.

NORTH ATLANTIC TREATY ORGANISATION

74. The N.A.T.O. Ministers, at their meeting in Paris in December, 1953, recognised that the increasing strength and unity of the Organisation had proved to be a decisive factor in maintaining peace, but considered that the threat to the Western world remained and that member countries must be ready to face a continuance of this threat over a long period. They laid it down that the N.A.T.O. nations should continue to improve the strength and quality of existing forces, in so far as they could afford it, so that in the event of attack, these forces could act as a shield behind which the full

strength of the member countries could be rapidly mobilised. This was in accordance with the United Kingdom view that the first priority should be to maintain unity and strength over a long period.

75. It was on this basis that the North Atlantic Council considered the Annual Review for 1953. This Review showed that the force goals established in April for the end of last year had been met for the land forces and to a substantial extent for the naval and air forces. The Council also noted with satisfaction the great improvement which had been made in the effectiveness of existing forces, particularly in the provision of equipment and the number of support units which had been built up. The United Kingdom met its goals for 1953 except for a slight deficit in aircraft.

76. Against the background of the need to maintain strength over a long period, the Council have initiated a study of the long-term aspects of N.A.T.O. defence and the important military and financial problems involved. In this connection, the Military Committee of the Council are carrying out a reassessment of the most effective pattern of military forces for the long term, taking account, among other factors, of the effect of new weapons.

77. Good progress has been made in joint defence production planning. The North Atlantic Council have initiated a series of correlated production programmes, particularly for aircraft, shipbuilding, ammunition, artillery and other weapons and electronics. In the field of standardisation an important achievement has been the acceptance of a standard, ·30 calibre, round for small arms ammunition; there are prospects of the adoption by a number of N.A.T.O. countries of the Belgian F.N. rifle; progress has also been made with our allies in establishing common doctrines and procedures.

78. An important change in the N.A.T.O. military command structure for Central Europe was made during 1953. Instead of the Supreme Allied Commander, Europe, being directly responsible for the defence of this region, an Allied Commander-in-Chief, Central Europe, has now been appointed with naval, army and air force commanders under him. This arrangement brings the Central Europe command system into line with those in Northern and Southern Europe. At the same time, the functions of the Deputy Supreme Commander (Air) at SHAPE were extended to give him authority for the definition of air policy and co-ordination of air activities, including the support of operations by air forces not under SHAPE's command, for example, the strategic air forces.

79. The N.A.T.O. Commanders continued their series of major exercises during 1953. In September, the forces of nine N.A.T.O. nations took part in Exercise "Mariner" which extended over the North Atlantic, the North Sea and the Channel. In October, Exercise "Weldfast" took place, the largest Allied maritime exercise ever held in the Mediterranean, with forces of the N.A.T.O. Mediterranean nations as well as those of the United Kingdom and the United States.

INFRASTRUCTURE

80. The programme of construction and development of military works and installations for the common defence of the N.A.T.O. area (collectively described as "Infrastructure") made further satisfactory progress during the past year. In April, 1953, the North Atlantic Council approved a

supplementary programme estimated to cost £67 million. The Council approved at the same time a cost-sharing agreement providing for member countries to make fixed percentage contributions (the agreed United Kingdom percentage is 11·45) to the cost both of the £67 million supplementary programme and of further new programmes up to a maximum of £250 million to be started in the three-year period beginning in 1954. These will cover additional airfields, oil pipelines and storage, communications networks and other essential facilities, including navigational aids in the Eastern Atlantic which, in peace-time, will be of great assistance to merchant shipping and civil aviation. The first of these new programmes (the 1954 programme) was approved by the Council in December, 1953, and is estimated to cost approximately £90 million.

81. The table below shows the first estimate of cost of each of the programmes so far approved and the corresponding contributions which the United Kingdom has agreed to make.

Programme	*First Estimate of Cost £million*	*United Kingdom Contribution £ million*
1950 (Brussels Treaty) ..	33	9
1951 (N.A.T.O.)	79	14
1952 (N.A.T.O.)	152	20*
1953 (N.A.T.O.)	82	7
1953 Supplementary (N.A.T.O.)	67	7·7 (11·45%)
1954 (N.A.T.O.)	90	10·3 (11·45%)

* To be furnished to the greatest possible extent in kind.

82. In addition to the contributions shown, there is a contingent United Kingdom liability in respect of the N.A.T.O. programmes to bear a proportionate share of the extra expenditure if the final cost of a programme should exceed the original estimate. The indications are that the final costs of the 1951 and 1952 programmes may appreciably exceed the original estimates.

83. The 1954 programme embodies the first substantial amount of work which the United Kingdom will be responsible for carrying out on behalf of N.A.T.O. This work includes projects in the United Kingdom, Malta, and Gibraltar estimated to cost about £6½ million (11·45 per cent. of this sum being chargeable to the United Kingdom).

84. The special arrangements which are peculiar to the 1952 programme, whereby the United Kingdom contribution is provided to the greatest possible extent in kind, have given rise to considerable difficulty in practice, but some progress is being made in negotiations with countries to which our contribution is due. In addition to performing a certain amount of work on the infrastructure programme for other countries as part of the contribution in kind, there is a good prospect of our being able to discharge a substantial part of our remaining obligations to them by the supply of finished military equipment.

EUROPEAN DEFENCE COMMUNITY

85. N.A.T.O. Ministers stressed once again at their December meeting that the institution of the European Defence Community, including a

German contribution, was essential for the reinforcement of N.A.T.O. United Kingdom representatives have co-operated closely with the military staffs of the E.D.C. Interim Commission, which are planning for the establishment of the European Defence forces. The British forces on the Continent are already closely linked, under N.A.T.O. operational command, with forces which will form part of the European Defence forces. However, the United Kingdom has put forward proposals to the Interim Commission for even closer military co-operation, particularly in matters of training, administration and supply.

VII.—CIVIL DEFENCE

86. Civil Defence is an essential, integral, and continuing part of our defence preparations for any future war. In the development of a policy which gives first priority to preparations designed to deter a would-be aggressor, the rôle of Civil Defence is necessarily a secondary one, and its contribution to that policy must inevitably be through the indirect support which it can give to increasing the efficiency of the armed forces. The allocation of resources to Civil Defence in 1953 has necessarily been limited by the more general considerations of economic policy outlined in paragraph 7 of this Statement. As with the active defences, it has been necessary to spread the programme over a longer period than originally proposed. Within these limits our policy is to build up a nucleus of services and productive capacity which could be readily expanded whenever it appeared necessary to prepare against an imminent threat of war.

87. The results of enemy attacks on this country in any future war are likely to be such that, to varying degrees, they must ultimately be the concern of every able-bodied citizen. Within this general effort, there would be the need throughout the whole country for large numbers in organised and trained civil defence services whose manifold tasks could not be wholly surrendered to any comparatively small body of specialists. The main body of Civil Defence is the several Civil Defence Services—the Civil Defence Corps, the Auxiliary Fire Service, and the National Hospital Service Reserve. Of these the largest is the Civil Defence Corps and good progress has already been made towards enrolling and training in peace the 500,000 men and women needed as a strong nucleus for rapid expansion to a war strength of at least one and a half million should the need arise.

88. In May, 1953, Her Majesty The Queen was graciously pleased to assume the titles of Head of the Civil Defence Corps and Head of the National Hospital Service Reserve. In the course of the year the total of enrolled members of the Civil Defence Corps increased from 247,370 to 321,163, the National Hospital Service Reserve increased from 34,471 to 41,041 and the Auxiliary Fire Service increased from 15,357 to 19,974. Recruitment varies much between Local Authority areas and between the different services and sections of the services. Deficiencies are greatest in the Auxiliary Fire Service and in the Rescue Section of the Civil Defence Corps.

89. The Civil Defence Corps has increased at a greater rate than in any previous year, owing principally to the widespread house-to-house canvassing efficiently organised by Local Authorities and carried out by their

Civil Defence Officers and teams of volunteers. This method has borne out the recommendations made in the First Report of the Advisory Committee on Publicity and Recruitment for the Cvil Defence and Allied Services.

90. The training of volunteers and of further instructors has proceeded throughout the year. New films and pamphlets have been made available; 1,357 instructors were trained at the national technical and tactical schools to bring the total of centrally qualified instructors to 7,120. New arrangements were made for the periodical requalification of instructors, including large numbers of those locally trained. The new Tactical Wing of the Civil Defence Staff College trained both senior officers and instructors throughout the year. More rescue training grounds have been provided in local authority areas for the practical training of volunteers.

91. Apart from the recruits for the services already mentioned, 146,000 volunteers are under training in industrial civil defence units, and a new Bulletin has given detailed guidance on the way in which the newly formed Industrial Civil Defence Service would co-operate in war-time with the local forces of the Civil Defence Corps.

92. First consideration has hitherto been given to the building up of the local Civil Defence Forces which contain, in addition to the Rescue Sections, those elements for control and communications, wardens' services, reconnaissance, first aid, and welfare which are complementary to, and essential for, the rescue operations during any attack and the subsequent relief work. It has, however, always been recognised that in conditions of atomic warfare, these services would need to be strongly supported by mobile forces consisting of whole-time trained personnel. To this end, the experimental mobile column, manned by volunteers from the Army and Royal Air Force, carried out during the year a number of exercises of different types with local divisions in many parts of the country in order that experience might be gained of the practical problems involved in maintaining and deploying forces of this kind and integrating them with the local static forces. This experimental column will be continued in the present year. The Government are now examining the possibility of making further progress in developing mobile columns.

93. In addition to the practical exercises carried out in conjunction with the experimental mobile column, a series of other exercises has been held dealing with particular civil defence problems and localities. Some of these took place in co-operation with the military authorities, when the rôle of the Home Guard in civil defence was studied.

94. A valuable series of courses and tactical studies in emergency fire-fighting for Chief Fire Officers was held at the Fire Service College where practical demonstrations were given of a variety of equipment specially designed and developed for dealing with the mass fires likely to arise from an attack on a large town by modern weapons.

95. Progress has continued throughout the year in many other directions; in the more detailed arrangements for any evacuation of the priority classes; for the physical requirements of the civil air raid warning system, including the provision of a special school with all necessary equipment for the training of warning staff; for further emergency feeding equipment and training in its use; for new installations concerned with the supplies of blood plasma.

96. In all regions and in some of the more vulnerable of the local authority areas, work continued on control rooms for civil defence purposes in war. Much work was done on the provision and protection of communications.

97. The progress in building up stores and equipment for civil defence purposes, although continuous, was uneven, due mainly to development difficulties with a new programme and its change in pace. The aim has been to concentrate in the main on those specialised items which are either necessary for training purposes in peace or which could not be produced quickly or requisitioned in an emergency.

98. Apart from the stockpiling of items of common use, priority in the past year was given to the production of fire-fighting appliances and equipment, radiation measuring instruments, gas respirators, hospital equipment and specialised equipment for emergency feeding.

99. It is intended to make further progress in all these directions during 1954.

100. In international collaboration on all civil defence matters, this country has played a leading part, within the framework of the Brussels Treaty Organisation and more recently in the extension of this mutual co-operation to include all the North Atlantic Treaty Powers.

ANNEX I

TABLE 1—ANALYSIS OF ACTIVE STRENGTHS

(Figures in thousands)

	April 1, 1953 (Actual)				*April 1, 1954 (Estimate)*				*April 1, 1955 (Estimate)*			
	Navy	*Army*	*R.A.F.*	*Total*	*Navy*	*Army*	*R.A.F.*	*Total*	*Navy*	*Army*	*R.A.F.*	*Total*
Regular	133·7	211·3	188·9	533·9	121·7	220·1	187·7	529·5	119·2	226·4	191·2	536·8
National Service ..	6·7	228·0	78·1	312·8	8·2	224·0	69·9	302·1	10·6	204·5	68·4	283·5
Women	5·2	9·1	10·1	24·4	5·1	9·1	9·7	23·9	5·2	9·2	9·6	24·0
Total ..	145·6	448·4	277·1	871·1	135·0	453·2	267·3	855·5	135·0	440·1	269·2	844·3

ANNEX I

TABLE 2.—ANALYSIS OF VOLUNTEER RESERVE AND AUXILIARY FORCES AND NATIONAL SERVICE RESERVES

	Strength at January 1, 1953				*Strength at January* 1, 1954			
	Normal volunteers	*N.S. volunteers*	*Part-time N.S.*	*Total*	*Normal volunteers*	*N.S. volunteers*	*Part-time N.S.*	*Total*
Royal Navy								
Royal Naval Reserve	3,456	—	—	3,456	3,738	—	—	3,738
Royal Naval Volunteer Reserve	8,773	604	151	9,528	9,042	1,070	439	10,551
Royal Marine Forces Volunteer Reserve ..	1,001	69	—	1,070	1,055	149	—	1,204
Royal Naval Special Reserve	—	—	7,946	7,946	—	—	9,629	9,629
Women's Royal Naval Volunteer Reserve ..	920	—	—	920	1,252	—	—	1,252
Army								
Territorial Army	67,351	37,664	93,770	198,785	60,310	55,776	136,694	252,780
Women's Royal Army Corps (T.A.) ..	9,730	—	—	9,730	9,569	—	—	9,569
Army Emergency Reserve	8,947	941	81,921	91,809	10,245	3,019	123,366	136,630
Women's Royal Army Corps (A.E.R.) ..	1	—	—	1	37	—	—	37
Queen Alexandra's Royal Army Nursing Corps (T.A.)	174	—	—	174	200	—	—	200
Royal Air Force								
Royal Auxiliary Air Force	5,899	584	—	6,483	5,745	763	—	6,508
Women's Royal Auxiliary Air Force ..	2,610	—	—	2,610	2,415	—	—	2,415
Royal Air Force Volunteer Reserve	11,142	768	—	11,910	9,913	1,659	—	11,572
Women's Royal Air Force Volunteer Reserve	693	—	—	693	523	—	—	523
Royal Air Force Reserve of Officers (N.S.) and Class H of the Air Force Reserve ..	—	—	82,178	82,178	—	—	124,364	124,364

ANNEX II

DIVISION OF THE DEFENCE BUDGET UNDER THE PRINCIPAL HEADINGS

Financial Year, 1954–55 (£ million)

1	2 Admiralty			3 War Office			4 Air Ministry			5 Ministry of Supply			6 Ministry of Defence			7 Totals		
	Gross	A. in A.	Net	Gross	A. in A.	Net	Gross	A. in A.	Net	Gross	A. in A.	Net	Gross	A. in A.	Net	Gross	A. in A.	Net
1. Pay, etc., of Service Personnel	50·67	0·56	50·11	138·05	14·97	123·08	89·18	2·83	86·35	2·55	—	2·55	3·03	—	3·03	283·48	18·36	265·12
2. Pay, etc., of Reserve, Territorial and Auxiliary Forces and grants for administration, etc.	1·83	—	1·83	17·01	0·18	16·83	2·18	—	2·18	—	—	—	—	—	—	21·02	0·18	20·84
3. Pay, etc., of Civilians ..	43·55	0·55	43·00	67·30	1·36	65·94	36·81	4·05	32·76	12·80	—	12·80	0·70	—	0·70	161·16	5·96	155·20
4. Movements	8·88	0·16	8·72	35·39	0·94	34·45	13·23	0·93	12·30	—	—	—	0·24	—	0·24	57·74	2·03	55·71
5. Supplies—																		
(*a*) Petrol, oil and lubricants	18·42	1·87	16·55	14·19	5·88	8·31	74·75	3·25	71·50	1·92	—	1·92	0·01	—	0·01	109·29	11·00	98·29
(*b*) Food and ration allowance	12·78	2·77	10·01	47·52	10·51	37·01	19·91	1·18	18·73	—	—	—	—	—	—	80·21	14·46	65·75
(*c*) Fuel and light	4·45	0·02	4·43	7·02	1·48	5·54	7·12	2·39	4·73	1·32	—	1·32	—	—	—	19·91	3·89	16·02
(*d*) Miscellaneous	0·69	0·68	0·01	2·30	0·12	2·18	1·13	0·25	0·88	—	—	—	0·12	—	0·12	4·24	1·05	3·19
	36·34	5·34	31·00	71·03	17·99	53·04	102·91	7·07	95·84	3·24	—	3·24	0·13	—	0·13	213·65	30·40	183·25
6. Production and Research† ..	215·36	25·35	190·01	225·00	15·00	210·00	267·00	22·00	245·00	685·64	582·64	103·00	—	—	—	866·74*	118·73*	748·01
Production and Research providing for the appropriation-in-aid of American aid receipts†	*215·36*	*39·35*	*176·00*	*225·00*	*41·00*	*184·00*	*267·00*	*67·36*	*199 64*	*685 64*	*682·64*	*103·00*	—	—	—	*866·74**	*204·09**	*662·65*
7. Works—																		
(*a*) Works	21·70	1·29	21·07	35·05	4·42	34·68	66·99	19·20	51·06	29·41	—	29·41	18·57	0·31	18·28	171·72	25·22	154·50
(*b*) Rents	0·66			4·05			3·27			—	—	—	0·02			8·00		
(*c*) Loan quarters	1·23	1·23	—	4·40	4·40	—	4·00	4·00	—	—	—	—	—	—	—	9·63	9·63	—
(*d*) Repayment of sums issued under the Armed Forces (Housing Loans) Acts, 1949 and 1953	0·07	—	0·07	0·50	—	0·50	0·44	—	0·44	—	—	—	—	—	—	1·01	—	1·01
	23·66	2·52	21·14	44·00	8·82	35·18	74·70	23·20	51·50	29·41	—	29·41	18·59	0·31	18·28	190·36	34·85	155·51
8. Miscellaneous effective services	6·64	1·58	5·06	11·52	8·00	3·52	8·79	2·82	5·97	—	—	—	1 56	0·04	1·52	28·51	12·44	16·07
9. Non-effective charges ..	16·37	0·24	16·13	19·20	0·24	18·96	5·40	0·30	5·10	—	—	—	—	—	—	40·97	0·97	40·19
10. Totals before appropriation-in-aid of American aid receipts	403·30	36·30	367·00	628·50	67·50	561·00	600·20	63·20	537·00	733·64	582·64	151·00	24·25	0·35	23·90	1,863·63*	223·73*	1,639·90
11. *Totals providing for the appropriation-in-aid of American aid receipts*	*403·30*	*50·30*	*353·00*	*628·50*	*93·50*	*535·00*	*600·20*	*108·56*	*491·64*	*733·64*	*582·64*	*151·00*	*24·25*	*0·35*	*23·90*	*1,863·63**	*309·09**	*1,554·54*

NOTE.—The expenditure by the Ministry of Labour and National Service in administration of the National Service Acts and in connection with the examination of volunteers for Her Majesty's Forces is estimated at £1·36 million.

* To avoid double-counting of payments by the Service Departments to the Ministry of Supply the cross totals of columns 2–6 have been reduced by £526·26 million.

† Includes the cost of development work undertaken by industry under contract, and the purchase of stores and equipment for research and development establishments.

STATEMENT OF THE FIRST LORD OF THE ADMIRALTY EXPLANATORY OF THE NAVY ESTIMATES, 1954–55

(Cmd. 9079)

If it were not for Mutual Defence Assistance from the United States, it would be necessary to ask Parliament for £367,000,000, or £2,500,000 more than the corresponding figure for the current year for the Royal Navy.

Provision is made, however, to appropriate in aid of expenditure under Subhead A of Vote 8, Section III, the sum of £14,000,000, to be granted as Mutual Defence Assistance by the United States of America. This reduces the amount required to £353,000,000, as compared with £329,500,000 for 1953–54.

The Vote A for 1954–55 provides for a maximum strength of 139,000 at April, 1954, and a reduction of a few hundreds during the year. As foreshadowed in my statement last year, all officers and men compulsorily retained or recalled from the reserves will have been released by March 31, 1954, thus bringing to an end the emergency manpower measures introduced in 1950.

To man the Navy at the level proposed we have therefore to rely on the normal resources of recruiting and re-engagement. The nature of our recruiting problem depends largely on the numbers of serving ratings who re-engage. Re-engagement will become a particularly acute problem in the next few years because very large numbers of men who entered on 7-year engagements after the war have now begun to reach the end of their engagements. Failure to re-engage in adequate numbers would mean not only a serious loss of experienced men but would increase recruiting requirements at a time when it is already proving difficult to obtain the number of volunteers required.

In the field of production the work of building up our minesweeping and anti-submarine forces remains our prime objective and some details of the progress made since my Explanatory Statement last year is given on page 404. The completion of the fleet carrier Ark Royal and the two light fleet carriers Albion and Bulwark, which I anticipate during the forthcoming financial year will provide a notable accession of strength to the Royal Navy.

J. P. L. Thomas

SOME NOTES ON NAVAL ACTIVITIES AND ADMIRALTY POLICY

The Coronation

The naval processional contingent at the Coronation was chosen to represent, in strict proportion, every section of the Royal Navy, and included officers and men of the Royal Navy and Royal Marines, the Royal Naval Reserve Battalion, members of the Women's Royal Naval Service, the Queen Alexandra's Royal Naval Nursing Service, and Naval V.A.Ds., with two Royal Marine bands. About 1,900 officers and men helped to line the route.

Royal salutes were fired by H.M. Ships all over the world, including H.M.S. Newcastle, lying in sight and sound of the enemy in Korea.

The Coronation Naval Review

On Monday, June 15, 1953, Her Majesty the Queen, accompanied by His Royal Highness the Duke of Edinburgh, reviewed her Fleet at Spithead.

The Review Fleet consisted of 197 British warships, representative of every class in service in the Royal Navy, and was commanded by the Commander-in-Chief, Home Fleet, Admiral Sir George Creasy, G.C.B., C.B.E., D.S.O., M.V.O., flying his flag in H.M.S. Vanguard. Thirteen Commonwealth warships took part in the Review and representatives of the Colonial Naval Forces were embarked in H.M. Ships. Among the other ships present were Royal Fleet Auxiliaries and representative ships of the British Merchant Navy and Fishing Fleets, and also sixteen foreign warships.

Her Majesty the Queen embarked in H.M.S. Surprise, which served as the Royal Yacht for the occasion, and passed through the lines of ships which were dressed overall, with ships' companies lining the upper decks. In accordance with tradition, H.M.S. Surprise was preceded by the Trinity House Vessel Patricia, and followed by H.M.S. Redpole with the Board of Admiralty embarked.

The review of ships was followed by a fly-past of some 300 naval aircraft representing all the types in service with the Fleet Air Arm and including some from the Royal Australian and Royal Canadian Navies.

The Royal Commonwealth Tour

Ships of the Home Fleet and the America and West Indies Station, together with ships of the Royal Canadian Navy, took up positions on the flight routes of Her Majesty the Queen and His Royal Highness the Duke of Edinburgh at the start of their Commonwealth Tour.

Ships of the Commonwealth Navies are sharing, with the Royal Navy, the honour of escorting Her Majesty in S.S. Gothic, and later in H.M. Yacht, Britannia, in which Her Majesty will embark at Tobruk for her homeward journey.

H.M. THE QUEEN TO REVIEW THE ROYAL NAVAL VOLUNTEER RESERVE

Her Majesty the Queen will review the Royal Naval Volunteer Reserve to commemorate its Jubilee on Saturday, June 12, 1954, on the Horse Guards Parade.

CO-OPERATION WITH COMMONWEALTH AND ALLIED NAVIES

During 1953, a considerable number of N.A.T.O. Naval exercises was carried out in the Atlantic, Channel, and Mediterranean Commands. These exercises have continued the progress made in the task of integrating N.A.T.O. forces and improving their state of preparedness.

The major exercise—*Mariner*—which took place in September, 1953, was the first N.A.T.O. exercise to be undertaken jointly by the three principal area Commands of the North Atlantic Treaty Organisation—the Allied Command, Atlantic, the Allied Command, Europe, and the Allied Channel and Southern North Sea Command. Some 300 ships and more than 1,000 aircraft took part in this large exercise in sea-air power in which forces of the following N.A.T.O. countries participated—Belgium, Canada, Denmark, France, the Netherlands, Norway, Portugal, the United Kingdom, and the United States.

The important exercise "*Weldfast*", directed jointly by the American Allied Commander-in-Chief Southern Europe and the British Commander-in-Chief Allied Forces Mediterranean, took place in the Aegean Sea and Greek and Turkish waters in October, 1953.

Ships and submarines from various N.A.T.O. countries visited the Joint Anti-Submarine School, Londonderry, at various periods throughout the year for anti-submarine training.

Co-operation between H.M. Ships and ships of the Indian and Royal Pakistan Navies has been maintained. In April, 1953, exercises were held off Ceylon between Indian and Pakistan ships and H.M. Ships of the East Indies Station. Later in the year, ships of the Royal New Zealand Navy and the Indian Navy returning from the Coronation Naval Review took the opportunity of exercising with H.M. Ships of the Mediterranean Fleet. Again, in November, ships of the Indian Navy exercised with H.M. Ships of the East Indies Station during the latter's visit to Indian waters.

EXERCISES

The combined manœuvres of the Home and Mediterranean Fleets, the only purely British large scale exercise held nowadays, will again take place in the Western Mediterranean in the early spring of this year. Aircraft of the Fleet Air Arm and Royal Air Force will take part.

BRITISH GUIANA

When in October last Her Majesty's Government decided to send Naval and Military Forces to British Guiana to preserve peace and public safety, the cruiser Superb and the frigates Burghead Bay and Bigbury Bay of the America and West Indies Station embarked troops at Jamaica and proceeded to the Colony where a party of Royal Marines disembarked with the Army personnel. The aircraft carrier Implacable carried reinforcements from the United Kingdom.

MALAYA

Patrols and bombardments in support of the security forces have continued in Malaya. Fishery protection, escorting duties, reconnaissance, and transporting troops are some of the many tasks regularly carried out by motor launches. A Naval Helicopter Squadron has continued to serve with great success in support of land operations.

THE KOREAN CAMPAIGN

During the campaign which ended on July 27, 1953, a total of 74 warships of Commonwealth Navies and the Royal Fleet Auxiliary Service operated off Korea for varying periods. They comprised 34 ships of the Royal Navy (including 4 aircraft carriers and 6 cruisers), 16 ships of the Royal Fleet Auxiliary Service, 1 hospital ship, 9 ships of the Royal Australian Navy (including 1 aircraft carrier), 8 destroyers of the Royal Canadian Navy and 6 frigates of the Royal New Zealand Navy. In order to maintain ammunition and other supplies to the Fleet, Royal Fleet Auxiliaries steamed more than 300,000 miles.

It is estimated that 17,000 officers and men of the Royal Navy, Royal Marines and Royal Fleet Auxiliary Service served in Korean waters and that a further 4,300 served in Japan. A total of 165 officers and men received decorations for distinguished service against the enemy and a further 289 were mentioned in despatches.

In all, the casualties suffered by the Royal Navy and Royal Marines were 57 killed, 2 died of wounds, 10 missing, 85 wounded, and 28 taken prisoner of war.

RESERVE FLEET RE-DEPLOYMENT

The re-deployment of the Reserve Fleet has proceeded during the year. A large number of the ships has now been moved to commercial ports for dehumidification and maintenance by contractors. As was hoped, the policy has resulted in a considerable economy in manpower, a large number of officers and ratings becoming available for service in the Active Fleet.

TRANSFER OF H.M. SHIPS TO OTHER NAVIES

During the past financial year the three frigates which were being refitted in this country for loan to India have been taken over by the Indian Navy.

A destroyer is being refitted for loan to Pakistan.

Refits of the two frigates to be lent to Norway are continuing, and the three frigates for Denmark, mentioned in last year's explanatory statement have been transferred on loan.

Two submarines formerly on loan to Greece and two formerly on loan to the Netherlands have been accepted back into the Royal Navy.

THE GREEK EARTHQUAKES

At the time of the earthquakes in the Ionian Islands in August the Royal Navy brought prompt aid. Ships of the Mediterranean Fleet were the first foreign warships to arrive and, when the extent of the damage became known, other of H.M. Ships at Malta were ordered to embark doctors, medical supplies, and rescue and other special equipment and stores. Naval parties landed on the islands of Ithaca, Cephalonia, and Zante, and worked in the devastated areas. H.M. Ships Daring, Gambia, Wrangler, Bermuda, Forth, Wakeful, H.M.N.Z.S. Black Prince, the Royal Fleet Auxiliary Spaburn, and the R.A.S.C. water-carrier Spalake all took part in relief work alongside ships of the Greek, United States, and Israeli Navies. Over a quarter of a million pounds weight of food, 6,000 blankets, 5,000 towels, 2,000 sets of clothing, and other supplies were distributed. It is estimated that naval working parties from the various ships worked 150,000 man-hours.

The Cyprus Earthquake

After the earthquake in Cyprus, two Sea Fury aircraft from the light fleet carrier H.M.S. Theseus flew 400 miles to make a photographic reconnaissance of the damaged area, and to discover what assistance was most needed. Later, men landed at Paphos from H.M. Ships Theseus, Daring, and Saintes to help in rescue work and in erecting tents for the homeless.

The Search for the Comet

The Royal Navy has played a leading part in the search for the remains of the B.O.A.C. Comet air-liner which crashed into the sea off Elba, and special equipment including underwater television, has been flown from the United Kingdom for use in the search.

Fishery Protection

Since 1919 the Royal Navy has been responsible for fishery protection, a task which is carried out by the Fishery Protection and Fifth Minesweeping Squadron of five minesweepers and two motor fishing vessels. These vessels operate wherever British fishermen require to be protected —or policed—notably in the Arctic waters north of Norway and Russia, and off Iceland, the Faroes, and Greenland. In Scottish waters they work in co-operation with the civilian manned Fishery Protection Cruisers operated by the Scottish Home Department.

Piracy

Following a report in November, 1953, that an Indian-owned dhow had been attacked and captured by pirates while on passage from Basra to India, H.M.S. Flamingo was instructed to search the southern coast of Arabia for the whereabouts of the pirated vessel. Helped by intelligence reports from political officers in the area, the dhow was located and taken in tow to Aden with the pirate captain and crew on board.

STRENGTH OF THE FLEET

The table on opposite page shows the strength of the Fleet in classes (excluding vessels of the fleet train, attendant ships and numerous small craft).

	Active Fleet	Training and experimental (Special (complements)	In Reserve including reducing to Reserve and preparing for service	In course of construction *
Battleships ..	Vanguard		Anson Howe Duke of York King George V	
Fleet Carriers ..	Eagle	Illustrious Indefatigable (*a*) Implacable (*a*)	Indomitable Victorious (*b*)	Ark Royal
Light Fleet Carriers	Glory Warrior	Triumph	Centaur (*c*) Ocean (*d*) Theseus (*d*)	Hermes Bulwark Albion Majestic (*j*) Leviathan(*k*) Hercules (*k*)
Ferry Carrier employed on Trooping duties		Perseus		
Cruisers	10	1	15	3 (*k*)
Daring Class Ships	6		2 (*e*)	
Destroyers ..	20	3	69 (*f*)	
Frigates	33	21	115 (*g*)	25
Fast Minelayers	1		2	
Monitors ..			2	
Submarines ..	37		20 (*h*)	
Minesweepers:				
Ocean ..	23	3	38	
Coastal ..	6	5	56	57
Inshore ..	9	3	52 (*i*)	57

* Excludes submarines.

(*a*) Employed on non-flying training duties in Home Fleet Training Squadron (to be relieved by Light Fleet Carriers).

(*b*) Modernising.

(*c*) Preparing for Service.

(*d*) Preparing for Service with the Home Fleet Training Squadron.

(*e*) Includes one preparing for Service.

(*f*) Excludes one refitting for loan to Pakistan.

(*g*) Excludes two refitting for loan to Norway.

(*h*) Includes two returned from loan to Greece and two from loan to the Netherlands.

(*i*) Includes those being fitted out for minesweeping.

(*j*) To be transferred to the Royal Australian Navy on completion.

(*k*) Work suspended (see Navy Estimates 1954–55 pages 232–233).

NEW CONSTRUCTION AND CONVERSION OF H.M. SHIPS

GENERAL

The naval production programme is now running at a steady level and output during the financial year 1954–55 should not differ significantly from output in the previous year.

The shape of the naval programme will be unchanged in 1954–55, emphasis remaining on the expansion of our minesweeper and anti-submarine forces and on completing the carriers under construction.

The programme of modernisation and conversion will still be substantial in the coming financial year and will, together with normal repair and refit work, keep the Royal Dockyards fully employed. The residue of new work of this kind, which will not be large, will be put out to contract. It is the intention to devote additional resources in the next few years, commencing in 1954–55, towards modernising dockyard plant and equipment.

It will not be possible to make any significant increase in the existing level of stocks of ammunition or stores but it is hoped to do a good deal towards restoring a proper balance between the various items.

NEW CONSTRUCTION

It is expected that the fleet carrier Ark Royal, and two light fleet carriers of the Hermes Class, Albion and Bulwark, will be completed during 1954–55. As Centaur, another Hermes Class carrier, is about to join the Fleet, only one carrier should still be under construction by the end of the year. All these new carriers will have angled decks.

Diana, the eighth and last ship of the Daring Class, is about to join the Fleet.

Progress on the frigates, minesweepers, seaward defence boats, and fast patrol boats, has been less rapid than was hoped, partly owing to production difficulties which are being overcome, and partly owing to problems inevitable with ships of new design. The first of the frigates is expected to be completed in 1954–55, and by the end of that year more than 100 minesweepers—coastal and inshore—should have been completed: almost all the seaward defence boats should be completed by the end of 1954–55.

MODERNISATION AND CONVERSION

The programme provides for the continuation of the modernisation of the Fleet. The conversion of 10 destroyers to anti-submarine frigates has been completed and, in addition, two of the existing anti-submarine frigates have been modernised. The modernisation of the submarine force continues.

FLEET AIR ARM

EQUIPMENT

The re-equipping of the Fleet Air Arm with jet and turbo-prop aircraft has made progress and Sea Hawk day fighters and Wyvern strike aircraft are in service. From America we have received a number of Avenger anti-submarine aircraft to bridge the gap until Gannets are in service, and further deliveries of aircraft fitted with airborne-early-warning radar, which are proving of great value in the Fleet.

The angled-deck and the steam catapult, both entirely British inventions, have been accepted for service in the United States Navy, and both the Royal and United States Navies are now engaged on their installation in aircraft carriers.

OPERATIONS

The light fleet carrier Glory, and later the light fleet carrier Ocean which relieved her, operated at high intensity in Korea until the Armistice.

The Naval Helicopter Squadron (No. 848) serving in Malaya has been markedly successful in an unusual variety of tasks in support of land operations. Apart from transporting troops and freight and evacuating casualties, these aircraft have lowered tracker dogs used to round up terrorists, dropped leaflets, and carried out valuable low reconnaissance work over clearings in the jungle. The Squadron has been awarded the Boyd Trophy, which is presented annually for the most outstanding feat of aviation in the Royal Navy.

During the summer one R.N.V.R. Air Squadron visited Malta for its summer training period. The remaining R.N.V.R. Squadrons paid week-end visits either to the Dutch naval air station at Valkenburg or to an R.A.F. station in Germany. A Dutch naval air squadron was attached to the Royal Navy for training from July 1, embarking subsequently in H.M.S. Illustrious for the N.A.T.O. Exercise *Mariner*, together with a second Dutch squadron which had been training in the United Kingdom for some twelve months.

ADMINISTRATION

Certain recommendations of a committee which investigated the relationship between the Admiralty and Ministry of Supply with a view to improving the production of naval aircraft, have been implemented; a Flag Officer is now Deputy Controller of Aircraft in the Ministry of Supply, and the Admiralty departments concerned have undergone some reorganisation.

RESEARCH AND DEVELOPMENT

The programmes of naval research and development have, in common with those of the other Services, recently been fully reviewed by the Departments, and by the Defence Research Policy Committee, as part of the Government's recent examination of the future requirements of the Services in terms of men and money. No radical alteration in the objectives of naval research has been found necessary since these objectives are, as hitherto, closely linked to the future strategic rôle of the Navy.

The main effort is therefore being directed to solving problems in the anti-submarine, anti-mine, and anti-aircraft fields. In spite of the great technical difficulty of many of these problems, the results of earlier work are being consolidated and certain new techniques of great potential importance are being developed. All possible steps are being taken to increase the manpower effort which can be made available for investigations of the more fundamental research, for it is largely upon this that the efficacy of Naval weapons and equipment of the future will depend.

The work on propulsive machinery for ships referred to in earlier Explanatory Statements has given results by no means short of Admiralty expectations. Already the "Deltic"—an internal combustion engine of advanced design and power/weight ratio—is in production and an improved type of marine gas turbine is being fitted in the motor torpedo boat Grey Goose to gain further experience of the behaviour of this type of machinery at sea. Modern chemical theory is being most successfully applied to the improvements of the efficiency of the steam plants which provide power for the larger units of the Fleet, and the Admiralty are confident that current research will lead to greater unbroken operational periods at sea, to economy of skilled maintenance staff, and to savings in running costs.

Collaboration with Commonwealth and N.A.T.O. naval authorities continues with mutual benefit. The Deputy Chief of the Naval Staff has visited Canada and the United States to discuss the development and use of new weapons and the application of scientific research to naval requirements, and the Chief of the Royal Naval Scientific Service is at present visiting Australia and New Zealand to further the integration of naval research programmes.

The Ministry of Supply is continuing its programme of research and development on naval aircraft, which is being planned to take full advantage of the steam catapult and the angled deck. Close collaboration between the Naval and Air Staffs on common projects enables both Services to obtain the maximum benefit from the Ministry's research and development effort.

NAVAL PERSONNEL

TERMINATION OF EMERGENCY MANPOWER MEASURES

All officers and men compulsorily retained on completion of normal engagements, or recalled from the reserves, who have not voluntarily undertaken to remain in the Navy beyond the end of March, 1954, will have been released by that time.

OFFICERS

A number of the officers previously compulsorily retained or recalled from the reserves have volunteered to serve for an additional period, but in view of the continuing shortage of experienced officers in certain branches a number of them, and of officers reaching retirement age during the next year, will be offered the opportunity to extend their service.

CADET ENTRY

Following the report of the Committee appointed to examine the scope of the existing methods of entry to cadetships in the Executive, Engineering, and Supply Branches (Cmd. 8845), it was decided that all cadets of the permanent entry should join the Royal Navy in one group between the ages of 17 years 8 months and 19 years. The first competition under the new scheme, which will be broadly similar to the present Special Entry competition, will take place in October, 1954. The existing method of entry at age 16 will be discontinued; the final competition will be held in June, 1954.

A thorough examination is being made of the form of officer structure and training so as to ensure that future naval officers are well equipped to undertake the responsibilities which developments in naval warfare will place upon them.

FLEET AIR ARM PILOTS AND OBSERVERS

Recruitment of naval pilots and observers on Short Service commissions over the past year was disappointing, although the numbers of national service men entering for flying training were satisfactory.

The Royal Navy still has a substantial number of vacancies for young men interested in becoming aviators on Short Service commissions of 8 years (or 4 years with opportunities for subsequent extension to 8 years). Up to 20 per cent. of Short Service officers who complete 8 years' service may be granted permanent commissions.

There are still opportunities for training to fly in the Royal Navy on national service commissions, but preference will be given to those willing to serve in the R.N.V.R. Air Branch during their part-time national service. It is hoped that many of those who enter in this way will subsequently volunteer for a short service commission of 4 years, extendable to 8 years.

RATINGS

The release of all retained men and recalled reservists inevitably leaves the Navy with shortages of petty officers and leading rates in a number of branches, despite the measures which have been taken to speed up the advancement of ratings where practicable. The prospects of building up the required numbers will depend largely on how many of the numerous Special Service ratings who reach the end of their 7-year engagements in 1954–55, and subsequent years will decide to stay on in the Navy.

RE-ENGAGEMENT

The proportion of men re-engaging to complete time for pension in the Navy as a whole has been maintained at the improved level reached in 1951 and 1952, namely 40 per cent. for R.N. ratings and 20 per cent. for R.M. other ranks. There is, however, considerable room for improvement in a number of branches in which the re-engagement rate is well below the overall average.

As the numbers completing 12 years' service, and thus becoming eligible to re-engage, are at present abnormally low, there is a need for a particularly high proportion to re-engage. The £100 re-engagement bounty has been extended for another year.

Some 8,000 of the very large number of ratings entered on Special Service engagements shortly after the war will become due for release from full time service and transfer to the Royal Fleet Reserve during 1954–55. This represents a serious potential loss of experienced ratings. It is therefore hoped that substantial numbers will decide to remain in the Navy; present indications are, however, disappointing.

RECRUITMENT

There has been a sharp deterioration in recruiting, particularly for the seaman and stoker mechanic branches and for the Royal Marines. This occurs at a time when recruiting needs are increased by the large numbers of ratings completing Special Service engagements.

NATIONAL SERVICE

It is planned to enter approximately 6,500 national service men into the Navy in 1954–55. This appreciable increase over the intake in recent years is because of the difficulty of obtaining the increased numbers of regular recruits needed to maintain strengths in the coming year. This figure of 6,500 excludes men expected to enter the Navy on regular engagements. A number of temporary commissions in the R.N.V.R. will continue to be available to suitably qualified national servicemen.

RESERVES

All members of the Royal Fleet Reserve recalled to service will be released by March, 1954, and large numbers of men on Special Service engagements are now completing their active service and entering this reserve. As a result the decline in strength of this reserve in recent years has now been arrested, and it is expected that numbers will increase to about 22,500 during 1954–55.

Recruitment of officers from the Merchant Navy to the Royal Naval Reserve (General Service) during 1953 has been satisfactory. Engineer Officers, who have formerly been difficult to recruit, are now coming forward in somewhat greater numbers. In the Royal Naval Reserve (Patrol Service) the entry of officers has been slow. The recruitment of ratings, mainly from young fishermen whose national service is deferred while they are members of this reserve, is satisfactory for seamen but less satisfactory for engine room ratings. It is intended during the year to commence recruiting officers for the Air Branch of the reserve from those pilots employed by civilian firms performing naval flying tasks, in order that their services may be retained by the Navy in event of an emergency. The overall strength of the Royal Naval Reserve is not expected to exceed 4,400 officers and ratings.

The Royal Naval Volunteer Reserve continues to increase and is expected to reach a strength of some 13,000 officers and men during the next financial year.

The Royal Marine Forces Volunteer Reserve continues to make steady progress and it is hoped to reach a strength of about 1,700 officers and other ranks during 1954–55 towards the increased establishment of 246 officers and 2,000 other ranks for this reserve.

Since recruitment began at the end of 1951 a total of some 1,250 officers and ratings has been entered in the Women's Royal Naval Volunteer Reserve. The increase has not been as large as anticipated because until recently it has not been possible to open recruiting in one of the Divisions owing to lack of accommodation. This difficulty has now been overcome and it is hoped during the year to increase the numbers to about 1,600.

The voluntary refresher training programme for Royal Naval Volunteer Supplementary Reserve and Women's Royal Naval Reserve officers has been completed, with the exception of a small number of specialist officers for whom training provision has been made in 1954–55.

The Royal Naval Special Reserve comprises national servicemen of the Royal Navy and Royal Marines during their part-time service and their extended reserve liability under the Navy, Army, and Air Force Reserves Act, 1954, if they do not join the voluntary reserves. This reserve is expected to reach a bearing of about 11,500 during the year.

WORKS PROGRAMME, 1954–55

The programme of new works to be commenced in the financial year 1954–55 makes increased provision for the rehabilitation and modernisation of the Royal Dockyards and other productive establishments, to the greatest extent compatible with meeting essential requirements for improved shore accommodation for the officers and men of the Fleet, and for storage and communications.

Works services in hand include important items for the modernisation of Royal Naval Barracks and the improvement of training establishments. The work of improving flying facilities at Royal Naval Air Stations at home and abroad is continuing; so is the development of research establishments.

A start will be made in building married quarters for naval personnel at the home ports. Provision of other married quarters at home and abroad will be continued.

THE ADMIRALTY OFFICE

The re-armament programme has continued to place a heavy strain on the headquarter staff of the Admiralty. There has, however, been a slight reduction in numbers between January 1, 1953, and January 1, 1954.

Mr. M. E. Adams, O.B.E., M.I.C.E., will succeed Sir Arthur Whitaker, K.C.B., M.Eng., M.I.C.E., as Civil Engineer in Chief on April 1, 1954.

NAVAL WAR MEMORIALS

THE PORTSMOUTH NAVAL WAR MEMORIAL

On April 25, 1953, Queen Elizabeth the Queen Mother unveiled the extension of the Portsmouth Naval War Memorial which commemorates the officers and ratings serving in Portsmouth-manned ships, and those ratings of the Portsmouth port division, who lost their lives in the Second World War.

THE FLEET AIR ARM MEMORIAL AT LEE-ON-SOLENT

On May 20, 1953, Her Royal Highness the Duchess of Kent, Chief Commandant of the W.R.N.S., unveiled at Lee-on-Solent the Fleet Air Arm Memorial to those officers and men of the Fleet Air Arm who died in the service of their country in the 1939–45 war.

THE ROYAL NAVAL PATROL SERVICE MEMORIAL AT LOWESTOFT

On October 7, 1953, the First Sea Lord, Admiral of the Fleet Sir Rhoderick R. McGrigor, G.C.B., D.S.O., unveiled the Royal Naval Patrol Service Memorial at Lowestoft, which has been built in memory of the officers and men of the Royal Naval Patrol Service who died in defence of their country in the 1939–45 war.

All three of these memorials commemorate officers and men who have no grave but the sea.

Vote	Service	Estimates, 1954–55		
A	Maximum number of officers, seamen, boys and Royal Marines, and members of the Women's Royal Naval Service and the Naval Nursing Service.			*Maximum Numbers* 139,000
		Gross Estimate	Appropriations in Aid	Net Estimate
		£	£	£
1	Pay, etc., of the Royal Navy and Royal Marines	48,361,000	561,000	47,800,000
2	Victualling and Clothing for the Navy	22,933,000	5,360,000	17,573,000
3	Medical establishments and services	1,497,000	60,000	1,437,000
4	Civilians employed on Fleet services	7,788,000	50,000	7,738,000
5	Educational services	1,114,000	114,000	1,000,000
6	Scientific services	16,304,000	639,000	15,665,000
7	Royal Naval Reserves	1,826,100	100	1,826,000
8	Shipbuilding, repairs, maintenance, etc.			
	Section I.—Personnel ..	35,313,000	185,000	35,128,000
	Section II.—Material ..	74,729,000	9,859,000	64,870,000
	Section III.—Contract work ..	100,957,000	23,095,000	77,862,000
9	Naval armaments	36,757,000	5,162,000	31,595,000
10	Works, buildings and repairs at home and abroad	18,137,000	1,300,000	16,837,000
11	Miscellaneous effective services ..	12,753,000	2,419,900	10,333,100
12	Admiralty Office	7,205,000	15,000	7,190,000
13	Non-effective services	16,367,000	245,000	16,122,000
14	Merchant shipbuilding and repair	23,800	—	23,800
15	Additional married quarters ..	1,235,100	1,235,000	100
	Total .. .. .. £	403,300,000	50,300,000	353,000,000

February 9, 1954

J. P. L. THOMAS
R. McGRIGOR

GUY RUSSELL
RALPH EDWARDS

Estimates, 1953–54			Difference on Net Estimates		Vote
		Maximum Numbers 151,000		*Decrease* 12,000	A
Gross Estimate	Appropriations in Aid	Net Estimate	Increase	Decrease	
£	£	£	£	£	
50,348,000	488,000	49,860,000	—	2,060,000	1
25,712,000	7,412,000	18,300,000	—	727,000	2
1,444,000	59,000	1,385,000	52,000	—	3
7,609,000	75,000	7,534,000	204,000	—	4
1,037,000	89,000	948,000	52,000	—	5
15,316,000	661,000	14,655,000	1,010,000	—	6
1,534,100	100	1,534,000	292,000	—	7
					8
34,985,000	294,000	34,691,000	437,000	—	Sec. I
78,192,000	15,500,000	62,692,000	2,178,000	—	Sec. I
97,410,000	38,676,000	58,734,000	19,128,000	—	Sec. III
34,382,000	5,570,000	28,812,000	2,783,000	—	9
19,445,000	1,405,000	18,040.000	—	1,203,000	10
11,880,000	3,079,900	8,800,900	1,532,200	—	11
6,890,000	12,000	6,878,000	312,000	—	12
16,803,000	196,000	16,607,000	—	485,000	13
39,000	10,000	29,000	—	5,200	14
1,473,100	1,473,000	100	—	—	15
404,500,000	75,000,000	329,500,000	27,980,200	4,480,200	

Net increase £23,500,000

S. M. RAW	G. GRANTHAM	ALLAN NOBLE
E. W. ANSTICE	G. BARNARD	S. WINGFIELD DIGBY
		J. G. LANG

MEMORANDUM OF THE SECRETARY OF STATE FOR WAR RELATING TO THE ARMY ESTIMATES, 1954–55

(Cmd. 9072)

PREFACE

1. EXCLUDING THE receipts arising from the sterling counterpart of aid received from the United States of America (*see* paragraph 3 below) the Army Estimates for 1954–55 amount to:

	£
Gross Expenditure	628,500,100
Appropriations in Aid	67,500,000
Net Expenditure	£561,000,100

2. On the same basis the figures for the three previous years were:

	1953–54	1952–53	1951–52
	£	£	£
Gross Expenditure ..	636,770,100	585,970,100	466,520,100
Appropriations in Aid ..	55,770,000	64,470,000	47,720,000
	£581,000,100	£521,500,100*	£418,800,100*

3. The figures in paragraphs 1 and 2 do not include the receipts appropriated in aid of Army funds arising from the sterling counterpart of aid received from the United States of America towards the defence burden undertaken by the United Kingdom in the common cause. In 1952–53 these amounted to £30,000,000 (H.C. 100 1951–52) and in 1953–54 to £55,000,000; the sum of £26,000,000 is included on this account in the appropriations in aid for 1954–55.

4. The gross expenditure in the Army Estimates for 1954–55 is £8,270,000 less than in the Estimates for 1953–54. The growth of the Reserve Army makes an increase in Vote 2 (Reserve Forces, etc.) inevitable. There is an increase in Vote 4 (Civilians) mainly owing to higher wages both at home and abroad but also due partly to an upward movement in the number of civilians employed, caused by the rearmament programme and our growing stocks. The increase in Vote 6 (Supplies) is due partly to higher prices and additional expenditure on food; but more than half of the increase is attributable to a changed method of accounting for the turnover of our stocks of petrol and is offset by higher appropriations in aid. Similarly most of the increase in Vote 9 is due to the provision for adjustment of the Korean Operations Pool Account and is offset by increased appropriations in aid. The substantial decrease in Vote 7 (Stores) is due to the necessity of restricting our defence expenditure in the economic interests of the country; and the drop in Vote 8 (Works) is due largely to reduced purchases of stores and plant.

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* Excluding Supplementary Estimates

5. Taking no account of the sterling counterpart of United States defence support aid the appropriations in aid in the Estimates for 1954–55 are £11,730,000 higher than for 1953–54. Well over half of this increase is due to the new accounting arrangements for turning over petrol (Vote 6) to which I have referred in paragraph 4 above, and to the provision for adjustment of the Korean Operations Pool Account (Vote 9). The only other significant variation from 1953–54 is an increase in the provision for contributions from the governments of East and West Africa towards the cost of the forces in those colonies.

OPERATIONAL

6. Last year I gave a rather fuller account of the Army's duties overseas than is usual in the memorandum on Estimates. I think that this was found to be of interest and this year I have repeated it. It shows the Army bearing an even heavier burden than last year and meeting an increased number of commitments. Many of these involve dangerous and difficult duties and others require patience and excellent discipline in fulfilling less sensational but most important tasks.

7. Although we reduced our garrison in Austria last year we have had to send more troops both to Kenya and the Caribbean area.

8. The extent to which the British Army is dispersed is unique in peacetime and in order to give some general indication of how widely it is committed I attach as an appendix to this memorandum a map showing its present disposition world-wide. (*See page* 434.)

9. Many units are in areas, notably Kenya and the Middle East, where the kind of amenities which were expected before the war are not available. This is either because the facilities in those areas were devised for what used to be a much smaller garrison, e.g., about a brigade in the Canal Zone where we now have about two and a third divisions; or because the duration of our stay is uncertain and does not justify the construction of even the simplest type of married quarters or barracks, for instance in Kenya, British Guiana, etc.

KOREA

10. The armistice was signed on July 27, 1953—the day before the second anniversary of the formation of the Commonwealth Division. The armistice saw the end of a long period of defensive fighting of exceptional bitterness and in conditions of great hardship to the men.

11. During the whole Korean campaign after the formation of the Division on July 28, 1951, casualties were as follows:

Component	*Died or killed in action*	*Wounded in action*	*Missing believed killed*	*Total*	*Prisoners of War since repatriated*
United Kingdom ..	444	1,680	49	2,173	955
Canadian	235	1,051	27	1,313	34
Australian	159	748	21	928	15
New Zealand ..	27	71	—	98	1
Total	865	3,550	97	4,512	1,005

12. Early in 1953 the Division moved out of the line for the first time since its formation in 1951. This was done for two main reasons. The first was the need to rest. The second was to enable the Division to shake itself clear, even if for only a short time, from static warfare and to carry out training in mobile warfare. Long periods in purely static battle gradually blunt the offensive spirit of the soldier no matter what precautions commanders may take to avoid this. The divisional artillery, however, remained in the line to provide support for the relieving United States division, and they earned high praise for the support they afforded. The divisional artillery was a tremendous weapon and was a dominating factor in the fighting in Korea so far as the Commonwealth Division was concerned.

13. The Division returned to the line in the spring and, although the war remained static, the Communists had increased their patrolling activity so markedly that our infantry patrols had to fight hard to dominate No-man's-land. In late May, 1953, after almost two weeks of preparatory reconnaissance the significance of which was fully understood, the Communists launched a strong attack on our left flank positions at the Hook. A bitter night battle developed but our troops, all from the United Kingdom in this case, fought the Communists to a standstill and the position was cleared of the enemy by daylight. Artillery fire combined with tank fire helped tremendously in breaking up many attacks before they could reach our positions. Our deep fighting bunkers and thick belt of wire kept most of the enemy in the open where defensive fire from artillery, mortars and flanking positions could kill them. Those few enemy who did get into the positions were defeated with close-range infantry weapons—the machine-carbine, the grenade and the bayonet.

14. This was the last time the Communists attacked the Commonwealth Division. The battle of patrols and the effort to gain local successes continued. But never again did the Communists attempt an all out offensive against us. Thereafter the enemy shifted his main attacks elsewhere, against the Republic of Korea formations and against isolated outposts which could be eliminated. These were made mainly in order to push the armistice demarcation line as far south as possible.

15. Thus ended, for the time being at least, the war in Korea. Since the formation of the Commonwealth Division in July, 1951, the war had been mainly a defensive war fought with great bitterness, a way where the ground prevented the exercise of mobility, and where the weight of shell and mortar fire on both sides against relatively small areas was tremendous. For instance, at the battle of the Hook in May, 1953, and in the preliminary preparations thereto, the Chinese poured 20,000 shells and mortar bombs into this very limited area. The defensive fire put down by our own divisional artillery and 4·2-inch mortars amounted to 32,000 rounds. In addition American corps and army artillery fired nearly 6,000 rounds in this battle. The aim of the attackers was to bring such a weight of fire to bear that the defences were destroyed before the attack ever started. The aim of the defenders was to get so far underground that they could survive the fiercest of artillery bombardments. These were developed to an extent unheard of in the 1939–45 war in any theatre.

16. In fact the war in Korea was more akin to the war in France in 1914–18. It was a war requiring first class artillery and staunch infantry.

The Commonwealth provided both in abundant measure and the enduring bravery and comradeship of the men of the Division was an inspiration to all the United Nations forces. In addition, pilots of the Royal Navy, Royal Australian Navy, and South Africa struck out at enemy guns, supply routes and dumps. And there was a field ambulance provided by India. Truly an assembly worthy of the British Commonwealth of Nations.

17. 1953 saw a new addition to the Commonwealth Division in the form of about 1,000 South Korean troops. These, locally known as KATCOMS, were integrated into infantry, engineer and signals units. They fought and worked alongside Commonwealth troops with zeal and enthusiasm.

18. Since the armistice the Commonwealth Division has had two main operational tasks. The first is the policing and guarding of our sector of the demilitarised zone. The second is the preparation of a powerful defensive position from which to fight should hostilities be resumed. In addition, in an uncertain political situation, the Division must be at all times at a high state of readiness. These tasks have been prosecuted with great zeal. The weather until early December was fortunately very kind. Thereafter the severity of winter has inevitably hampered progress and has made sentry duty and patrolling a great hardship. The Commonwealth Division had made strenuous efforts to be properly prepared for the winter. The winter clothing is excellent and the food good. The troops are disposed in large and small groups, mainly to meet operational requirements. They are to be found tucked away in valleys all over the general vicinity of the 38th Parallel. Sleeping accommodation is entirely in tents made suitable for winter by the addition of wooden floors and petrol fuelled tent heaters. Canteens, messes, dining halls, some offices and the recreational centres are in huts provided by the United States and ourselves.

19. Apart from leave in Japan (to which each man has an entitlement of seven clear days a year) the Division runs a small change-of-air camp near the sea at Inchon. We have, of course, our own rest centres in Japan organised by the British Commonwealth Forces. Cinema shows continue with frequent changes of programme. Concert parties from the United Kingdom, Canada, Australia and New Zealand take turns in touring units to give popular and eagerly welcomed entertainment. There are a fair number of welfare wireless sets and the Division runs its own short-range radio station. Finally the education staff runs a four page daily news sheet, so the troops are kept well up to date with world news.

20. The Commonwealth Division is in great heart. The spirit of comradeship is inspiring. Whatever the future in Korea may hold, the Division will without doubt meet cheerfully and efficiently whatever demands may be made upon it.

THE FAR EAST

21. The general situation in the Far East Command has not changed very much during the past year. A considerable proportion of the Army serving there is still under active service or near active service conditions, and its task is still the defence of our interests and the fulfilling of our responsibilities in South East Asia. Now more than ever the peace and security of South East Asia depends on the Army's success in dealing with

that task. This review is therefore set against the same background as last year's, and describes the progress made since then in Malaya, Singapore and Hong Kong, the three main components of the Command.

22. In Malaya we still have British and Gurkha soldiers, colonial troops from East Africa and Fiji, the local forces of the Malay and Federation Regiments, and a small element from Sarawak. Every effort is being made to expand and increase the local forces of Malaya and to train them to take an effective part in the defence of their homeland. The 7th Battalion of the Malay Regiment will be operational in 1954. The 1st Squadron of the Federation Armoured Car Regiment has been operating effectively for the major part of the past year, and progress is being made in the raising of the 1st Battalion of the Federation Regiment, an infantry unit open to recruiting from all races domiciled in the Federation.

23. In Hong Kong the troops are still mainly British with an increasing proportion of Gurkhas.

24. There has been much progress in the work of the security forces in freeing Malay from the Communist threat and the Army has played a very full part in discharging this task. In many parts of the country the main roads are now open for travel by individual vehicles without escort. Normal life everywhere is carried on with a greatly increased feeling of safety and under much improved conditions. A large part of the coastal area of Malacca is sufficiently free of Communist influence to allow the lifting of emergency restrictions and the resumption of normal activities. It is hoped that this improvement will soon be extended.

25. But although considerable progress has been made, the armed enemy still exists in formidable numbers. In spite of the success of the campaign against him and the measures introduced to destroy his supply system and intelligence network, he is still able to obtain all the recruits he wants. This he does by intimidation and indoctrination of the young Chinese. We have, however, succeeded in forcing a change in tactics on him and he can no longer carry out ambushes on the main routes or commit acts of murder and terror in the settled areas without incurring the risk of swift retribution and punishment. He has been driven back into the deeper parts of the jungle where the dense nature of the country and complete lack of communications make it very much more difficult for us to bring our full strength to bear on him. Our tactics are keeping pace with this situation and new techniques have been evolved to deal with it.

26. We are taking every possible step to profit from the loss of morale among the enemy forces which has resulted from their defeat in the settled areas and their enforced withdrawal into the jungle. One method is the use of a specially equipped "voice" aircraft which can broadcast messages and surrender terms to those parts of the jungle which bandits are known to inhabit. This is done in conjunction with the dropping of many surrender leaflets and safe conduct passes.

27. A new and indeed remarkable technique has been developed by the Special Air Service Regiment whereby they are able to parachute direct into the tree-tops of virgin jungle. This has given a far greater flexibility to this unit which can now be employed on special missions even where suitable normal dropping zones do not exist.

28. The arrival of additional helicopters, provided by the Royal Navy, has given our forces a mobility never previously attained. Many troops

have been lifted quickly and without loss of security and have been moved within hours to areas of deep jungle which it would have taken days to reach on foot.

29. Lastly we have developed a new phase in the campaign which is designed to carry the offensive into the deep jungle and by so doing to weaken further the enemy's morale and deny him supplies. A system of "jungle forts" has been established in the mountainous forest range which runs through the centre of Malaya where no roads exist. The main object is to protect and thereby gain the confidence of the aboriginal inhabitants many of whom have been under Communist domination since the beginning of the emergency. These forts are first established by the Army and then handed over to police garrisons. They are supplied by air and used as bases from which patrolling can be carried out into the heart of enemy territory.

30. Mention has been made of helicopters. All these new techniques make use of them, and their versatility and adaptability make them quite invaluable in this war. They are used on a variety of tasks notably on the rapid removal of a sick or wounded man from the heart of the jungle. The Army has the greatest admiration for their gallant pilots and I should like to express our thanks to them.

31. Mention must also be made of the part the young officer and the young non-commissioned officer play in the fight against the Malayan terrorists. The nature of the campaign dictates that patrols will be small and will live, move and fight in complete isolation, often for periods of many days. Our junior leaders and the men they command, both including a large proportion of national servicemen, are forced to rely on their own judgement and initiative. They need to be adept at all aspects of improvisation, to develop a sound knowledge of the technique of air supply and to attain a degree of independence which will serve them in good stead in the future in any part of the world. That they do all this so successfully is an excellent performance which merits high praise.

32. The war in Malaya has two aspects; the shooting war which is directed against the armed terrorist himself and the battle for the goodwill of the civilian on whose co-operation his very existence depends. Progress on the latter has been unspectacular but steady and our troops have once again distinguished themselves as unofficial ambassadors. The adoption of new villages by British military units has given the soldier the opportunity for active participation in all aspects of Malayan rural life, ranging from training the Home Guard to entertaining the children and taking part in local festivities. The confidence thus engendered has a very real effect on our ability to make contact with the elusive enemy.

33. The Army is part of a team in this struggle against the Communist terrorist. It works in close and very happy association with all other members of the team, without whose co-operation and friendly assistance its efforts would be in vain. I refer to the civil administration in all its forms, including the police and the Home Guard, and naturally to the other two Services, the Royal Navy and Royal Air Force.

34. The island of Singapore continues to maintain its importance as our main supply base in the Far East; and all troops from Malaya and all sea traffic to and from Korea and Hong Kong pass through the port. It holds and maintains units training for action in Malaya and those which

are awaiting shipment home; and it is also the junction of all military air traffic entering and leaving the Command. Satisfactory progress has been made in the development of the base and the preparation of its defences.

35. The situation in Hong Kong is one that still requires the utmost vigilance from our troops. There, as in Korea, we are face to face with Chinese Communist forces. The Army is employed in the construction of artificial obstacles, the preparation of strong defensive positions, and keeping itself ready in all respects to meet any aggression. It is not perhaps a very exciting task but it is certainly not a light one.

36. The increase in our commitments in South East Asia in recent years has necessitated a much larger garrison than in the pre-war years. Furthermore, the base of Singapore has to contain many more stores of all types than previously, some of a highly technical nature. All this means that a lot of buildings are required to house the men and stores concerned. Work continues on the necessary building programme but our resources are always limited and a great deal remains to be done. For instance, it is a significant thought that in Hong Kong the single officer or man arriving there from Korea often finds himself living under conditions very little better than those which he faced under active service conditions in Korea. Another most important requirement is the provision of more quarters to enable families to accompany their husbands when posted to stations in this Command.

The Middle East

37. The British Army, as for many years past, is playing a vital part in maintaining conditions of stability in the Middle East. It is an arduous, uncomfortable and often monotonous task but the British soldier, with his extraordinary flair for adapting himself to novel surroundings, continues to carry out his exacting duties with irrepressible good humour and high morale. It is not too great a claim to state that there is no other army in the world which would acquit itself in these circumstances with such credit to its nation.

38. *Egypt.*—The situation in Egypt has been dominated during the last year by the prolonged negotiations with the Egyptian Government for an agreement on the future of the Canal Base. The present series of negotiations began in April, 1953, and has dragged on indecisively ever since.

39. The Egyptian attitude during these months has resulted in a very hard time for the Army. A large number of attacks, robberies and incidents of all kinds have made the soldier's life always tense and frequently dangerous. During the period from May 15 to November 15, 1953, there were no less than 885 incidents in the Canal Zone directed against our men or their families. During 1953 there were 127 attacks with firearms, 34 attacks with knives and 93 attacks with other weapons. 16 British subjects were murdered between January 1, 1953, and January 30, 1954. It is not easy to picture the effect of the tension produced by this situation and its impact on the life and work of the soldier and his family.

40. The soldiers have two main tasks in the Canal Base, to operate it and to defend it. These are done in a climate which is at certain times of the year as trying as any in the world and amongst an unfriendly and often hostile population.

41. Most units live in almost completely tented camps, surrounded by barbed wire, which are extremely cold in winter and desperately hot in summer. They are subjected to sandstorms, flies, and mosquitoes. The amenities in these camps, and indeed the living conditions generally, are all of a most austere standard as it has never been possible to spend the millions of pounds really required on accommodation under the circumstances of uncertainty which now obtain.

42. It is far from easy for a soldier to get away from this atmosphere of tents, sand, barbed wire and flies. If he leaves the camp, he must be armed and escorted. There are indeed few places for him to go to as it has been impossible to provide amenities on the scale required for the large garrison which came at such short notice. To compensate for his inability to take local leave away from the conditions in which he lives, special leave schemes exist for the soldier. He can travel to Cyprus free and stay at a good leave camp quite cheaply, or he can go to the United Kingdom at a reduced fare.

43. The soldier's duties involve necessarily an immense number of guards to secure the depots, installations and property from the activities of the Egyptian thieves who are skilled and ruthless. It is, however, the large number of vindictive assaults which have taken place recently which have made life especially unpleasant and dangerous. The thugs trained for this work attack in such ways as lying in wait at night and hoping to find men off their guard or jumping on vehicles and attacking drivers and escorts from behind. The soldier's life therefore demands constant alertness and skill in handling weapons.

44. In addition to training for this task, every opportunity is taken to train men and formations in desert warfare in case they should be required to take part in large scale operations.

45. The hardship of separation of husbands from their wives and children, owing to the shortage of married quarters and the lack of any form of society as provided by normal towns and villages, is another big factor which affects the Army's life in the Canal Zone. One of the few advantages in the Canal Zone is the opportunity which occurs for organised games and sports between units. Men off duty have plenty of opportunity to play football, hockey, and cricket and to swim. This produces a spirit of comradeship not so eaily cultivated elsewhere.

46. In spite of all difficulties, depots, installations, and workshops in the Zone are functioning with the maximum effectiveness which can be expected from the number of technicians available and all units are fit, cheerful, and in good heart.

47. *Libya.*—The Anglo-Libyan Treaty, which has recently been signed, permits us to station some of our Middle East garrisons along the North African coast. This area, which brings back so many proud memories, will under the terms of the Treaty be a permanent station for British troops for at least the next twenty years. Already work is starting on the accommodation and installations required now that a stable agreement has been reached.

48. British units are stationed mostly in good barracks in an attractive climate. Good training is being carried out on a unit level and relations with the local inhabitants are very good. During a recent visit of the Commander-in-Chief to Benghazi and Tripoli, guards of honour of police

turned out whenever they could, wearing every Africa star they could muster. . . . .

49. *Jordan.*—The Anglo-Jordanian Treaty binds us in close friendship with the kingdom of Jordan. Here the Arab Legion, with an approximate strength of one division, is a tribute to the efficiency and devotion of a band of British officers headed by General Glubb. The friendly co-operation which exists between the British and Arab officers and men of the Legion and with the Jordanian Government, is a fine example of the friendship and confidence which can be achieved between Britain and an Arab state.

50. The 16th Independent Parachute Brigade Group have carried out a series of interesting and strenuous exercises in Jordan. Emplaning from their station in the Canal Zone they have flown hundreds of miles over the mountains and deserts of Sinai and Jordan to be parachuted at dawn into an imaginary battle area in Northern Jordan. These exercises have demonstrated the resolute determination of our parachute troops, whose tough efficiency is in the highest traditions of their distinguished corps.

51. *Cyprus.*—Cyprus is rapidly becoming a major British Army station. The new cantonment of Dhekelia on the east coast of the island is swiftly taking shape and within a few years will be ready to accommodate a brigade group in modern barracks and with good social amenities. The Royal Engineers are the arm of the Service most involved in Cyprus at present and their units are employed in every type of works service from piping water from a mountain spring to laying out and supervising the construction of complete barracks.

52. *General.*—The Middle East Command was able to bring help very rapidly to the victims of the recent earthquakes in Greece and Cyprus. Within a matter of hours engineer plant, tents, and stores and a squadron of Royal Engineers were despatched to Greece. To Cyprus Royal Engineers were flown at once by flying boat from the Canal Zone and ships of the Royal Navy and War Department Fleet sailed from Malta and the Canal Zone with thousands of tents and blankets, bulldozers for clearing rubble, food, drinking water and medical supplies. In both countries British troops with their unfailing sympathy and good humour did splendid work in bringing help to the homeless and destitute.

53. In conclusion, probably in no other command is the Army carrying out tasks of greater diversity or difficulty. There is no straight battle to fight but the tasks are all of great importance and require alertness, initiative, determination and restraint. All visitors to the Middle East pay tribute to the high morale of the Army there and it is certain that this high morale will be maintained whatever the future may hold in store.

East Africa

54. East Africa was formed into a separate command in June, 1953, so that more co-ordinated and intensive action could be taken against Mau Mau. In addition to Kenya, the Command originally included Uganda, Tanganyika, Zanzibar, Mauritius, the Seychelles Islands, Northern Rhodesia, and Nyasaland. The last two territories have now joined the Central African Federation and no longer form part of East Africa Command. Before federation the area of the Command was approximately

equivalent to all Europe west of the iron curtain. Federation has reduced this by about half. The approximate total of the population now is African 17,600,000, Asian 193,000, European 44,000 and mixed 550,000.

55. The main centre of trouble has been Kenya. The Mau Mau Secret Society had strongly established its hold on the Kikuyu tribe before the emergency was declared in October, 1952. The Mau Mau made a determined effort to intimidate the whole of the Kikuyu tribe (1,500,000 strong). The Lari massacre, in which 84 men, women and children were murdered and burned to death, occurred on March 26, 1953, and was a determined effort to intimidate the Kikuyu in an important area near Nairobi. European murders were also included in this stage of the campaign. The police and security forces were so stretched to provide protection that there was little to spare to take offensive action against the gangs.

56. The arrival in March, 1953, of the 39th Brigade (1st Battalion, the Buffs and 1st Battalion, the Devonshire Regiment) improved the position. In August, the 1st Battalion, the Black Watch arrived from Korea and in October the 49th Brigade (1st Battalion, the Royal Northumberland Fusiliers and 1st Battalion, the Royal Inniskilling Fusiliers) arrived from the United Kingdom. The 3rd Battalion, the King's African Rifles, returned from Malaya in August and became operational in November. The 5th Battalion, the King's African Rifles, which was due to go to Malaya was held back for duty in Kenya.

57. By the beginning of December, 1953, three Brigades were deployed —39th Brigade, 49th Brigade, and 70th Brigade—with a total of five British battalions, five King's African Rifles battalions, the Kenya Regiment and two mobile columns based on the East African Armoured Car Regiment and the 156th Heavy anti-Aircraft Battery, East African Artillery. In addition the 4th Battalion, the King's African Rifles moved to Uganda. A squadron of Harvard aircraft had arrived in March, 1953, capable of dropping 20-pound bombs, and a detachment of four Lincolns, capable of dropping 500- and 1,000-pound bombs, arrived at the end of November.

58. The Mau Mau tactics went through several phases. By June, 1953, the gangs were beginning to collect in large numbers in the forest and the anti-Mau Mau resistance in the shape of the Kikuyu Guard was beginning to gain strength in the native reserve areas. The next few months saw intensive action by the ground troops and aircraft against the gangs in the forests which had then become areas completely prohibited to anybody except the security forces. This drove the gangs deeper into the forest. The military answer was to drive jeep tracks deep into the forest so that military operations could commence at an advantage and be continued without supply restrictions. The 39th Corps Engineer Regiment arrived to assist on the development of forest tracks and other Royal Engineer tasks. The engagement of the gangs in the forest enabled the administration to continue to establish the Kikuyu Guard posts. These Kikuyu Guard posts now number 312 and have an approximate strength of 20,000. They are the militant anti-Mau Mau element and, although there have been setbacks, they are steadily growing in strength and influence.

59. These conditions enabled the police to establish themselves, and the combination of military force in the forest, with Kikuyu Guard and police in the reserve, made it possible for the administration to re-establish their authority. The gang reaction was to reduce the size of each gang so

that it was easier to control and administer. They moved to the edge of the forest partly to avoid bombing and partly to simplify the problem of feeding. They did their best to re-establish their influence over the reserve by repeating their intimidation tactics. But they found the Kikuyu Guard and police ready for them.

60. That is the pattern in the area of the Aberdare mountains. Near Mount Kenya much the same picture is unfolding itself in approximately the same sequence. The settled areas of European farms near the Aberdares and Mount Kenya have suffered raids, mainly for food, and there have been murders of European and loyal Africans as part of the general terror campaign.

61. The greatest difficulty is to pick out the Mau Mau from the anti-Mau Mau and to create conditions in which the Kikuyu as a tribe can live without fear. It must be recognised that the residue of Mau Mau is still numerous, dangerous and desperate.

62. Outside Kenya the situation has remained quiet except for a short outbreak in Nyasaland and a threat in Uganda—mostly by the Buganda leaders.

The British Army of the Rhine

63. Our forces in Germany still comprise three armoured divisions and one infantry division and, working within the British 1st Corps, we still have a Canadian infantry brigade group; the 27th Canadian Infantry Brigade Group has now been replaced by the 1st Canadian Infantry Brigade Group.

64. Higher training carried out in the British Army of the Rhine during the past year has demonstrated clearly a high standard of leadership and cohesive working on a divisional and corps level. A series of command exercises with signals have shown that on the command and staff level co-operation between the British Army of the Rhine and the 2nd Tactical Air Force is very good indeed. In these times of ever-increasing air power such training has been of the greatest importance.

65. The practice of concealment, camouflage and deception, which the threat from air power and the possible development of nuclear warfare demand, have received considerable attention. Commanders on all levels are alive to their problems and know practicable and sound answers to them.

66. The extreme importance of being able to work with allies, and the command and staff problems which this brings in its train were the central theme of the large manoeuvres with which the training season culminated. On this occasion the 11th Armoured Division and the Canadian Brigade Group were placed under the command of the Netherlands 1st Corps. The results were highly satisfactory and showed that not only our commanders and staffs but the troops as well could and would react most happily to these conditions.

67. The British Army of the Rhine does its part to help in the training of the Territorial Army. 27 officers and 157 other ranks were sent to the United Kingdom during the summer to assist the Territorial Army at their annual camps. In addition certain minor units of the Territorial Army carried out their annual training in Germany and about 1,000 Army

Emergency Reserve personnel of the Royal Armoured Corps carried out annual training with units in Germany.

68. Considerable emphasis has been placed on the individual training of the soldier in the skilful use of his particular weapon. The national serviceman has shown great keenness and the results indicate that the general standard which he has been able to reach has been most satisfactory. Shooting both with small arms and artillery has shown very good results. Tank gunnery practice has shown a general improvement and the standard is a high one.

69. In the British Army of the Rhine, there have been considerable administrative developments.

70. The establishment of an advanced base by the construction and stocking of depots in Belgium for the holding of war reserves, and the provision of semi-permanent camps for those operating the base, is now well advanced. The main installations are completed except for certain minor projects and the married quarters. It is hoped that most of these will be finished during 1954–55.

71. The new joint headquarters at München Gladbach, west of the Rhine, for the commanders of the naval, land, and air forces is making remarkable progress. It is intended to move into the new location in the late summer; this will permit the evacuation of large numbers of requisitioned premises in other parts of Germany. The project will on completion provide a satisfactory scale of amenity and there is every reason to be satisfied with the numbers, design, and furnishing of the married quarters we are building, within the limits of size imposed by the need for economy.

72. The living conditions of a command abroad with 12,000 women and 15,000 children, in what is for posting purposes a home station, require constant attention. Our policy is to retain in Germany some of the amenities which cannot for various reasons be provided yet in other overseas theatres.

Changes in British Troops, Austria

73. Our forces in Austria have now been reduced from three battalions to one battalion and supporting services. This action was prompted by our desire both to reduce our commitments and also to meet requests by the Austrian Government for a reduction in the burden of military occupation. The battalion remaining in Austria is the 1st Battalion, the Middlesex Regiment.

Developments in Trieste

74. It was hoped that, following the tripartite declaration of October 8, 1953, we should be able to withdraw our forces from Trieste, thus making three battalions available for service elsewhere. In anticipation of this the families and a proportion of heavy stores were withdrawn. Unfortunately it has not yet been possible to obtain diplomatic agreement on the future of Trieste and the proposed withdrawal of the garrison has had to be postponed.

75. The conduct of our forces during the recent riots was beyond praise and upheld the best traditions of the Army. The present conditions of

service in Trieste are not as satisfactory as I would wish, but we are doing our best to improve them. Once again the Army is performing invaluable service under awkward conditions to ensure the maintenance of law and order.

ACTION TAKEN IN BRITISH GUIANA

76. To counter the threat of serious civil disturbances in British Guiana in October, 1953, we had to move the 1st Battalion, the Royal Welch Fusiliers, the only United Kingdom battalion in the Caribbean area, to British Guiana. The arrival of this unit was an important factor in restoring public confidence and in maintaining law and order after Her Majesty's Government's decision to suspend the constitution had been announced. A relief battalion, the 1st Battalion, the Argyll and Sutherland Highlanders, was sent from the United Kingdom to British Guiana at short notice later in October, 1953, and the 1st Battalion, the Royal Welch Fusiliers returned to their normal duties.

77. As in so many other areas of the world the presence of British soldiers has averted serious civil disturbances and they are carrying out their duties admirably. Some families have already left the United Kingdom to join them.

TRAINING

78. Some mention has already been made of the training being carried out in the commands in which the Army is primarily engaged on operational duties and where, even under these circumstances, various forms of training have proceeded as far and as fast as other commitments allow.

79. The most intensive training has, however, been undergone in this country and in Germany. At home the intake of national servicemen has continued to be dealt with efficiently and I think that the excellent results achieved by national servicemen and young regular recruits in Korea, Malaya, and Kenya vindicate the training methods adopted during the primary training period.

80. One of the major training exercises of the past year was mounted by the 16th Airborne Division (Territorial Army) in Norfolk last summer. This was the biggest airborne exercise ever conducted by a Territorial Army formation. The major part of two brigade groups together with heavy equipment including guns and vehicles were successfully landed by parachute. The effect on morale was excellent and it is our intention to mount exercises of this size as often as opportunity allows.

81. Germany probably provides the finest training areas in Europe and the three armoured divisions have taken the fullest advantage of these exceptional opportunities. Training in Germany is of a most realistic nature and the British Army of the Rhine is now in a state of preparedness which has probably never before been achieved by a British force in peacetime.

MANPOWER

ACTIVE ARMY

82. *General.*—The measures which were taken in mid-1950—the extension to two years of the period of full time service of national servicemen, the recall of reservists and the retention of regulars due for release—were

designed to produce a rapid expansion of manpower. Thus the strength of the Army was raised to an artificial level which subsequent normal intakes of regulars and national servicemen could not be expected to maintain. The recalled reservists and the retained regulars have now been released and in addition the augmented intake of national servicemen during 1952 and 1953 is due to run out during the next two years. As a result the strength of the Army will inevitably fall from now onwards. The fall in 1954–55 will be some 13,000 men. At the same time world-wide commitments have increased.

83. I have included as Appendix A to this memorandum a table showing a comparison of strength figures as at the end of 1951, 1952, and 1953.

84. *Recruiting*.—I have also included at Appendix B a comparison of recruiting results in 1951, 1952, and 1953.

85. Whilst recruiting in 1953 was not as successful as in the previous year, it remained well above the 1951 level and the fall in the number of men entering the Army, as compared with 1952, is to some extent due to the smaller size of the national service intake.

86. Since May, 1952, men have been able to enlist on one of two types of regular engagement. The first is for three years with the colours and four on the reserve; the second is for 22 years' colour service with the option of taking their discharge at the end of any three year period. Men who enlisted before May 1, 1952, may extend their colour service to complete up to 12 years or re-engage to complete 22 years. 49 per cent. of all men recruited on normal regular engagements from civil life in 1953 enlisted on the 22 year engagement as compared with 22 per cent. from May to December, 1952. In addition 6,048 serving national servicemen converted to regular engagements compared with 8,306 in 1952 and of these 12 per cent. took the 22 year engagement.

87. Recruitment of boys has been very satisfactory. Altogether 2,656 boys were recruited in 1953 (2,488 in 1952), of whom 914 were apprentices (684 in 1952).

88. *Regulars*.—A disturbing feature, to which I drew attention last year, is the declining number of regulars with over six years' service. By the end of September, 1953, the last of the regulars retained as a result of the Korea crisis had been released and the proportion of regular soldiers with over six years' service to the total other rank strength had inevitably fallen. This is the field from which we must draw our warrant officers and senior non-commissioned officers and we shall continue to be short of these until our proportion of experienced regulars increases. Men serving on the new types of engagements, the first of which was not introduced until late in 1951, naturally cannot start to improve this proportion until at the earliest the end of 1957. Any early improvement must therefore depend upon getting more of the regulars on the old type engagements to prolong their engagements. The numbers of extensions and re-engagements recorded in 1953 were 3,368 and 615 respectively, as compared with 3,813 and 891 in 1952. In addition, a number of soldiers serving on the old type engagements have changed to the new 22 year engagement; but even after making allowance for these, the total number of prolongations of service causes concern.

89. *National Servicemen*.—The intake of national servicemen into the Army in 1954–55 will be some 6,000 less than in 1953–54, compared with

a fall of 25,000 between the intake of 1952–53 and that of 1953–54. The number of national servicemen serving at the end of the financial year 1954–55 is expected to be about 20,000 less than at the end of 1953–54; this decline is due to the run-out of the augmented intake which the Army received in 1952–53. From the point of view of quality, the call-up of deferred apprentices has given us an important increase in the number of skilled tradesmen.

90. *Officers.*—The officer position has not changed much since last year. The number of regular officers continues to increase slowly, but the Army is still some ten per cent. short of its total requirements of officers. The extended service commission, which was introduced late in 1952, has so far been granted to some 1,770 short service officers.

91. We are doing all we can to stimulate officer recruiting, and there are signs of improvement. I am sure, however, that our present selection standards must not be lowered.

92. Last year I emphasised the increasingly important influence that science and technology must inevitably exert in the Army of the future and described certain projects intended to meet the great demand in future years for officers with a scientific education.

93. Welbeck College opened in September, 1953, and at the end of the Christmas term the Headmaster was able to give a very satisfactory report of the first entry of boys both as regards character and academic standard. The College should eventually produce a steady flow of really good regular officers into the technical corps.

94. The direct entry, through national service, to the Royal Military College of Science at Shrivenham is now reasonably established, and has already brought us some good quality young officers. It offers a degree education combined with the early grant of a commission, and as it becomes better known, it should prove a popular entry to the technical arms as an alternative to Sandhurst, for those suitably qualified. It also offers to young serving officers courses leading to good honours degrees in science and engineering. These officers come largely from the Royal Engineers, Royal Signals and other technical arms but some of them also come from armoured regiments and the infantry. This is an invaluable contribution towards meeting the imperative need for technically highly trained officers in all arms of the modern Army. In addition the College also runs a number of short courses for Staff College graduates with the aim of giving them a general understanding of scientific and engineering problems in the development, production and use of modern armaments. Last year there were 300 students at the College; today there are 400; and in January, 1955, there will be 440.

95. The Royal Military Academy at Sandhurst remains the major centre for training future regular officers. It turns out on average about 500 young officers a year after a course of 18 months devoted equally to military and academic subjects.

96. It has been decided to form a permanent corps of officers (regular, extended service and short service) for the Royal Military Police, to supply a long felt requirement.

97. *Improvements in the pay of officers of the R.A.M.C. and R.D.C.*—I referred last year to the shortage of medical officers and to the study which was being made of this problem. As a result of this study certain im-

portant improvements were made, with effect from October 1, 1953, in the conditions of service of medical and dental officers. For medical officers the main improvements were a grant of £1,500 on being granted a regular commission, pay increases of £90 to £240 a year for majors and above, and an increase of four shillings a day in specialist pay. For dental officers the measures included a grant of £1,250 on being granted a permanent commission, pay increases of £82 to £228 a year for majors and above, and an increase of four shillings a day in specialist pay.

98. *Waverley Committee.*—Lord Waverley has generously accepted the chairmanship of a committee to review the arrangements for providing medical and dental services for the Armed Services at home and abroad, in peace and war. The provision of an adequate number of regular medical officers and particularly of specialists and surgeons has since the war presented a most difficult problem. Conditions of service both in military and civil life have changed radically since 1945. There is little doubt that a searching review of this problem is essential if it is to be dealt with satisfactorily in the coming years.

99. *Investigation of command and district organisation.*—During 1953 a committee, under the chairmanship of General Sir Sydney Kirkman, G.C.B., K.B.E., M.C., investigated the present command and district organisation of the Army in the United Kingdom. While the findings of this committee did not lead to any radical changes in the structure of command in the United Kingdom, I am hoping to secure by June 1, 1954, reductions in headquarter establishments equivalent in officers, other ranks and civilians to the saving which would have been made had it been possible to do away with a Command headquarters in the United Kingdom. A number of recommendations made by the committee have been adopted.

WOMEN'S SERVICES

100. *Queen Alexandra's Royal Army Nursing Corps.*—Although the Corps is still 37 per cent. below its establishment of officers, numbers are gradually increasing and the standard of nursing has been maintained. Part-time civilian nurses continue to be employed in military hospitals at home and overseas to ease the situation. The intake of officers during 1953 was 262 compared with 197 in 1952. At the same time in 1953 we lost 196 nursing officers, a large proportion of them on marriage. The strength of officers on December 31, 1953, was 1,120 compared with 1,054 on December 31, 1952.

101. The strength of other ranks on December 31, 1953, was 929 compared with 835 on December 31, 1952. Of these 347 were serving overseas.

102. *Women's Royal Army Corps.*—The number of other ranks recruited in 1953 was 3,240 compared with 3,066 in 1952. Recruiting at the beginning of the year maintained the level to which it rose in the latter half of 1952, but it fell off in the second half of the year despite strenuous efforts by the recruiting staff.

103. Progress has been made with the measures referred to in my memorandum last year. The experiment of raising a local service unit in Edinburgh has been a success and we shall probably develop the scheme in other areas. The system by which recruits can enlist for employment

in one of particular groups of trades has encouraged recruits; and good results are being obtained from the new scheme for employing an officer or other rank throughout her service with one of the technical arms of the Army. Short service commissions for staff duties were introduced in 1953 and quartermaster commissions will be available in 1954.

RESERVE ARMY

104. The build-up of the Reserve Army has continued steadily throughout the year. It will reach its peak after June 30, 1954, when the first national servicemen who have completed their part-time obligation will start to leave. The Reserve Army will not reach the size originally planned when national service was introduced. This is for two main reasons: first, the reduction in October, 1950, of the period of part-time service from four to three and a half years; secondly, the number of regular recruits accepting the new three year engagement with its accompanying exemption from any part-time training liability which has produced a proportionate reduction in the number of national servicemen in the Reserve Army.

105. *Army Emergency Reserve.*—The rate of creation of units in this reserve has been very satisfactory. Whereas there were only 770 units formed on January 1, 1953, the number formed by January 1, 1954, was 1,015 out of a total order of battle of 1,091—more than 93 per cent. Incidentally, this order of battle represents a revision of the total of 1,200 units to which I referred in last year's memorandum.

106. In other respects the build-up of the Army Emergency Reserve is less satisfactory. The problem of the men who live too far away from Territorial Army units to carry out in full their part-time training obligation has resulted in a build-up of the general pool of the Army Emergency Reserve at the expense of the Territorial Army. We are now trying to counteract this factor by a less rigid application of the posting rules.

107. The number of volunteers for the Army Emergency Reserve has been disappointing. We want them to total at least 15 per cent. of the reserve but so far the average number in units is five per cent. The position is under consideration and steps to improve it may have to be introduced.

108. *Territorial Army.*—For the last three years the Territorial Army has been rapidly filling up with national servicemen who have completed their two years' full time service with the Regular Army. By June of this year, it will be approaching its maximum strength, and in consequence the strain on the volunteer officers and non-commissioned officers, who are responsible for so much of the training and administration, is increased considerably. Two main problems lie before us at the present time: first, to retain as many as possible of the more senior volunteers who have stayed on since the war and have given such excellent service; and secondly, to induce as many as possible of the national servicemen, who will soon be completing their part-time three and a half years, to stay on as volunteers. With this end in view we are introducing certain new measures and others are under consideration with the aim of reducing the very considerable administrative work which now falls on officers and non-commissioned officers among the volunteers in the Territorial Army.

109. We have also, in conjunction with the Territorial and Auxiliary

Forces Associations, made suggestions to Commands which will enable commanders to ease the training burden on the volunteer officer and non-commissioned officer so that the demands on their time can be reduced to reasonable proportions. In addition, we have introduced a four-year training cycle which will ensure that higher formation training occurs only once in every four years and adequate attention is paid to individual training. It should also result in Territorial Army units having an adequate number of camps as far as possible in areas near to those in which they are recruited.

110. Of the national service officers and other ranks now doing their part-time service about 30 per cent. have become volunteers in the Territorial Army. It is to be hoped that a large proportion of them will re-engage for further periods so that they will eventually replace the senior officers, warrant officers and non-commissioned officers who have done so much to help the Territorial Army since the war. Many units have high hopes in this respect and many of the young national servicemen have shown a most lively interest in the Territorial Army.

111. To recruit an adequate number of volunteers is of great importance because in 1953 we lost 1,300 volunteer officers and 16,000 other ranks. On the other hand we were fortunate enough to recruit 1,000 officers and 9,000 other ranks as volunteers for ex-regulars and from men who had no national service liability since they had left the Army after the war.

112. In 1953 three Territorial divisions carried out divisional training on Salisbury Plain. The standard reached was exceptionally high and many British and foreign observers were deeply impressed by the efficiency of these formations.

113. *Home Guard.*—The Home Guard has made steady progress during 1953 and its strength at the end of the year was: enrolled strength 34,000; reserve roll 28,000; total 62,000. Further progress has been made in the completion of plans for their tasks in an emergency and training to that effect has already gone forward. The Home Guard has now reached a standard of efficiency and strength which makes it a most valuable force for rapid expansion and deployment in war. The quality of volunteers remains very high and the general keenness displayed by these public-spirited and unpaid volunteers is beyond praise.

114. *The Army General Reserve.*—We are about to form a branch of the Royal Army Reserve which we are going to call the Army General Reserve. This branch will take those men who have a liability to reserve service as a result of the Navy, Army, and Air Force Reserves Act, 1954.

115. National servicemen who have completed their period of five and a half years' whole and part-time service or service which is regarded as in lieu of or equivalent to that service will go into the reserve under the terms of the Act, as also will those Z reservists who are under the age of 45 years. Broadly, the liabilities imposed by the Act are for recall to the Colours if the United Kingdom is attacked or threatened or if there is a grave national emergency, and for notification of details of occupation and qualifications when required to do so. No training liability is involved.

ARMAMENTS AND STORES

116. *Tanks.*—The Regular Army is now fully equipped with the Centurion tank which has continued to show itself to be the best tank of its size

in service today. Production is more than adequate to meet our own needs and fortunately we have been able to maintain our production potential against war by the sale of Centurion tanks to other countries.

117. We have made progress with the development of the new heavy-gun tank and a certain number of these tanks will be tried out in Germany this year.

118. *Other armoured vehicles.*—The new scout car, the Ferret and the new six-wheeled armoured personnel carrier, the Saracen, are now in full production and have been tried out in the major theatres overseas. The scout car has already proved itself to be an outstanding vehicle in trials. The armoured personnel carrier is of a very modern, unorthodox design and although it is having some teething troubles has shown a remarkable cross-country performance and should prove itself to be a first-class vehicle.

119. *Load-carrying vehicles.*—We have made every effort to reduce the number of vehicles to the essential minimum. Further reductions are still being made and have been assisted by the maximum possible use of trailers. Production of new load-carrying vehicles has made good progress during the last year and the new types have shown themselves to be most satisfactory. Many of them are now being used by units although of necessity a sufficient number must be held against mobilisation. We still have, however, within the British Army, an unduly large number of old and rebuilt vehicles and it is our intention to embark upon and keep to a plan whereby the replacement of old and worn out vehicles proceeds on an orderly and adequate basis. This programme should ensure that we are never placed in the position of having a very large number of old vehicles becoming unserviceable at the same time.

120. *Artillery.*—The only new weapon of major importance which has been introduced during the past year is the new light anti-aircraft gun for defence against low-flying aircraft. This is an improvement on the old Bofors gun and includes a fast power traverse. The old L-60 (40-millimetre) light anti-aircraft gun has been modernised by the addition of power control and a number of anti-aircraft units have been issued with them. In addition the latest L-70 light anti-aircraft gun, a greatly improved version of the L-60, is becoming available. With the addition of British-designed fire control instruments, the L-70 will be an outstanding addition to low-level anti-aircraft defence.

121. *Infantry weapons.*—Considerable progress has been made in the last year in going forward with the re-equipment of the Infantry with the latest weapons. The Energa grenade and the 3·5-inch rocket launcher are now in general issue and the old and heavy 17-pounder anti-tank gun is being replaced by the new, lighter and more powerful 120-millimetre recoilless anti-tank gun. These are all excellent weapons and their introduction in larger numbers greatly strengthens the Infantry's battle potential.

122. The new sub-machine gun known as the Patchett has been adopted as a replacement for the Sten gun. It performed extremely well during troop trials and has already been used in operations both in Malaya and Kenya. It has proved itself to be a very good weapon.

123. Now that the Standing Group of the North Atlantic Treaty Organisation have agreed on the new ·300-inch calibre round we have given production orders for ten million rounds in this country for use in trials

with the new FN rifle during the coming year. This round is lighter than our present ·303-inch and is much better suited for use in automatic weapons.

124. As announced in Parliament it has now been decided to adopt the FN rifle. The British rifle was of most excellent design but the difference in performance of the two weapons was marginal. Because the FN was the type of rifle favoured by the Canadians and is also being ordered for trials by America, it was decided that its adoption was the wisest course in view of the greatly increased prospects of North American production. Neither Canada nor the United States would favour the adoption of the British E.M.2. I should, however, like to take this opportunity of congratulating the designers of the latter on the skill and ingenuity with which this excellent weapon was devised.

125. The FN rifle is of Belgian design, modified to meet our particular requirements. It is simpler in design than the E.M.2. and has an advantage in being a particularly easy rifle to maintain and to teach. 5,000 rifles have been ordered for immediate troop trials in all theatres during the coming year. The Canadians have also ordered 2,000 and the Americans, as I have already stated, are showing a great interest in the weapon. It has now been announced that the Belgian Army is also going to change over to the FN rifle.

126. *Engineer equipment.*—A heavy girder bridge is now in production. It is of new design based on the Bailey panel type of construction, and is capable of carrying the heaviest tanks in the Service. The first deliveries of it will shortly be in the hands of troops. We have also started a programme of conversion of our present Bailey bridge parts to provide bridges sufficiently wide and strong for the new tanks. Other improvements in our equipment for river crossing are the new Light Assault Floating Bridge, Class 30, and the Heavy Ferry, Class 80. These represent a considerable advance on existing equipment, in construction methods, in performance and in operation.

127. A new and more powerful range of mines, which are required for dealing with heavier tanks, is in the hands of the troops. A mechanical minelayer designed to speed up the laying of minefields is also now in service. The wartime stock of mechanical earthmoving equipment, for which we were dependent on the United States, is being replaced by new British equipment which has been developed in conjunction with British industry and is of excellent quality. It has already been widely used in the civil engineering field where it has gained a good reputation.

128. *Signal equipment.*—The Army still depends for communications largely on signal equipment which was in use at the end of the last war. This is rapidly wearing out and is a heavy burden on both the operators and the maintenance staff. Trials have now taken place with a large range of new wireless sets to be used by the Royal Armoured Corps, Royal Artillery, and Infantry, and production of the first new sets will start in 1954. They will provide better communications and will be more reliable and easier to operate. Research and development continues and particular attention is being paid to the development of new equipment for the Royal Corps of Signals.

129. *Airborne forces' equipment.*—The British four-engined, tail-loading aircraft, the Blackburn Beverley, will shortly be introduced into the Royal

Air Force. Development work has proceeded on equipment which will enable full use to be made of the characteristics of this aircraft. Trials with the dropping of heavy equipment have demonstrated that from this new freighter it will be possible to drop by parachute the whole of the fighting equipment of a parachute brigade group, including its field guns. This will greatly increase the mobility and effectiveness of our airborne forces.

130. *Atomic weapons.*—We have given a great deal of thought to the defensive and offensive aspect of the introduction of atomic weapons. Defensively, training has gone ahead in various methods of protection and detection. Radiac instruments for detection are now in production and training versions are already in the hands of troops. We are nearing a decision on the introduction of an effective Army weapon of offence. This will probably take the form of a ground-to-ground medium range guided missile.

131. In addition a three day indoor exercise was held by the Chief of the Imperial General Staff at Camberley in August, 1953. It was attended by representatives from the other Services, Ministry of Supply and all the Commonwealth countries, including Southern Rhodesia. A close study was made of the problems of supply, communication and movement under atomic attack and also of the tactical and strategic use of atomic weapons. The lessons learnt are being disseminated through Command and lower formation exercises. All possible steps are being taken to ensure that the introduction of atomic weapons will find the Army well prepared in their offensive use and in methods of defence.

132. *Standardisation.*—During 1953, we reached agreement with the United States Army and the Canadian Army on a revised basic standardisation policy; this lays down the features to be aimed at in planning new types of equipment now under development. The agreement includes the results of our experience in this field over the last four years. In addition the three nations have continued their full and frank exchange of information and material relating to new developments. The benefits of this will be felt with the introduction of new equipment now being developed.

WORKS AND QUARTERING

HOME

133. I mentioned last year the bad state of repair of Army buildings; in many cases the buildings themselves are very old and seriously in need of modernisation. We have accordingly drawn up a plan, which will necessarily be spread over a number of years, for improving the accommodation which we provide for the single soldier in the United Kingdom. We are making a start with the work this year. When the project gets under way, I hope that we shall be able to provide modernised and improved accommodation for several thousand men each year.

134. The accumulation of stores as the rearmament programme gathers way, will, we estimate, necessitate new covered storage accommodation of some 25 million square feet. We have made good progress in the construction of this. Over seven million square feet has already been built and a further two and a half million square feet is planned for 1954–55.

135. We are also continuing to make good progress in the building of new married quarters at home. These are financed mainly from the loans approved by Parliament in the Armed Forces (Housing Loans) Acts of 1949 and 1953. The Army's share of the 1949 loan (£18 millions) will have been completely used by 1954–55 and I am glad that we have been enabled to continue this important work by the approval which Parliament has given to the new loan.

136. We also propose to start the modernisation of old married quarters and the conversion of quarters of obsolete pattern, mainly those with one bedroom only, into more modern types. Many of these are still without proper bathing and hot water facilities and, although initially it was right to devote the bulk of available money to the provision of new quarters in order to unite as many families as possible, the time has now come to bring these old quarters into line with the new ones.

137. We shall also undertake the building of further new training centres for the Territorial Army, and the modernisation of existing centres.

Abroad

138. Steady progress is being made in the provision of permanent accommodation including married quarters at those overseas stations where the long term establishment of the units at the stations has been definitely settled. The new cantonment for the infantry brigade group in Cyprus is going ahead well and, as the treaty with the Libyan Government has been concluded, improvements to accommodation in North Africa have been started.

139. I regret that in a number of stations where the commitments are not permanent it has not been possible to provide anything but a very limited number of married quarters and only temporary accommodation for the troops.

MOVEMENTS

140. As long as the bulk of the Army is overseas and our commitments continue at their present level, we cannot hope to make any material reduction in the volume of movement or its cost. Our general policy of using air instead of sea transport whenever it is economical to do so is now well established.

141. Action is now being taken to bring more modern types of aircraft into the trooping service. For the next few years, it is hoped to encourage the use of such aircraft on the Far East route by instituting a regular air trooping service to that theatre for the first time. At the same time an examination is being made of means by which new types of passenger aircraft, now in the development stage, could be brought into trooping service as soon as they are available. Air trooping to the Middle East will continue at its present high rate.

142. The normal method of moving whole units is still by troopship. Our present fleet consists of 13 ships and we are gradually improving the standard of accommodation on these. Five vessels have already been brought up to full post-war standards of comfort and five more have been refitted on a modified scale to bring them nearer to present day standards. The remaining three ships are ex-migrant ships and are only temporarily employed on trooping service.

GENERAL

MARRIED FAMILIES

143. I have set up a departmental committee to make a full investigation and make recommendations to ease the present situation. They are looking into the problem of making life as easy as possible for the very large number of wives who remain in this country because they cannot follow their husbands overseas owing to the lack of accommodation. Some of these wives manage to live with relations and some are accommodated by the Army in special hostels. I want to do everything possible to help them during this enforced separation which springs from the unusual conditions with which the Army of today is confronted.

DISCIPLINE

144. There is every reason to believe that the improvement in the standard of discipline in the Army, on which I commented last year, is continuing. The number of convictions by courts-martial shows a steady reduction over the past four years.

HEALTH

145. There has been no marked change in the general health of the Army during the past year. Admissions to hospital have remained at a fairly steady level overall. There were a fairly large number of enteric fever cases in the Canal Zone during 1953. Special investigations have been made to try to discover the cause of each outbreak.

EDUCATION AND ENTERTAINMENT

146. There are no important developments within the fields of education and entertainment to report since my memorandum for 1953–54. Our activities continue along the lines described in that memorandum.

N.A.A.F.I.

147. During the past year, the Navy, Army, and Air Force Institutes have been called upon to take over from the Australian Canteen Service the conduct of a service for all Commonwealth troops in Japan; they were already responsible for providing this service for all Commonwealth troops in Korea. The Korean truce has naturally added to the demands on the N.A.A.F.I. service there and they have met these demands admirably.

148. In Egypt N.A.A.F.I. have had to face a situation of great difficulty. Local labour has been difficult to find, the number of British staff has had to be suddenly and drastically increased and, owing to the shortage of local supplies of food, families who normally bought many goods in the local civilian market have suddenly turned heavy demands on N.A.A.F.I. All this has created a very difficult situation but I am much impressed by the way in which the necessary improvisations have been made.

VOLUNTARY AND PHILANTHROPIC ORGANISATIONS

149. In recent years, the financial resources of the voluntary and philanthropic organisations have been depleted by a considerable fall in the subscriptions received from members of the public. In spite of this, these

organisations have continued to give us their whole-hearted and loyal co-operation and the Army very much appreciates it. In the past year, they have never failed to meet any reasonable calls we have made upon them and they rendered especially valuable assistance, both in Japan and in the United Kingdom, in connection with the repatriation of prisoners of war from North Korea.

CONCLUSION

150. 1953 has brought heavy duties to the Army. Many long-service regulars have found themselves serving exceptionally long spells overseas and for the married man this has only too frequently meant long periods of separation from wives and families. Of the married men now serving their overseas tour no less than two-thirds are still separated from their wives.

151. Battalions which completed their overseas tour of three years and returned to this country have found their stay here curtailed because of some sudden demand caused by the kind of situation which suddenly arose in Kenya and the Caribbean. All this has caused uncertainty and disturbance in the normal routine of postings and unit movements. To illustrate the extent of disturbance which the present situation brings with it, there is one battalion which has changed station 19 times since the war. Four others have only had two months' service in this country since the end of the war. It is therefore not surprising that, because the modern Army is more skilled technically and therefore its members better qualified for jobs in civil life, a number of longer-service men have left the Army during the past year.

152. Nevertheless during 1953 the Army has carried out its various and difficult duties all over the world in an exemplary manner. We have never before had a better peace-time army and never before has a peace-time army been more highly tested. I think that they have earned the full gratitude of the nation and indeed of the western world with whose forces they have co-operated to make a vital contribution both to our security and the cause of peace.

ANTONY HEAD

THE WAR OFFICE,
February 18, 1954.

APPENDIX A

COMPARISONS OF STRENGTHS IN THE ARMY AS AT DECEMBER 31, 1951, 1952, AND 1953

	December 31, 1951	December 31, 1952	December 31, 1953
1. *Male Officers*			
Regulars . .	17,458	17,900	18,442
Short Service	11,848	11,406	8,890
Extended Service	—	—	1,770
National Service	4,084	4,359	4,479
Others	258	202	182
Total, Male Officers	33,648	33,867	33,763
2. *Male Other Ranks* (excluding Boys)			
Regulars	155,811	175,041	176,874
Short Service	18,941	6,275	2,653
National Service	222,015	223,161	214,088
Others	123	—	—
Total, Male Other Ranks (excluding Boys)	396,890	404,477	393,615
Total, Male Officers and Other Ranks . .	430,538	438,344	427,378
3. *Boys*	3,759	4,241	4,679
4. *Women*			
QARANC Officers	1,042	1,054	1,120
QARANC Other Ranks	576	835	929
WRAC Officers	459	439	435
WRAC Other Ranks	5,526	6,455	6,456
Total, Women	7,603	8,783	8,940
5. Total strength, Active Army, Men, Women, and Boys	441,900	451,368	440,997

APPENDIX B

ARMY RECRUITING: MALE OTHER RANKS 1951, 1952, 1953(*a*)

	Annual Totals		
	1951	1952	1953
NORMAL REGULAR ENGAGEMENTS			
From Civil Life			
1. Men with no previous service	12,068	35,742	29,725
2. Men with previous service	4,233	4,449	3,329
3. Enlisted Boys	2,229	2,488	2,656
From Serving Soldiers			
4. Men on Short Service engagements	2,177	892	37
5. National Servicemen	4,604	8,306	6,048
6. TOTAL, NORMAL REGULAR ENGAGEMENTS: Men (1, 2, 4, and 5 above)	23,082	49,389	39,139
7. TOTAL, NORMAL REGULAR ENGAGEMENTS: Men and Boys	25,311	51,877	41,795
SHORT SERVICE ENGAGEMENTS			
8. *From Civil Life*	235	392	373
From Serving Soldiers			
9. National Servicemen	400	536	409
10. Other than National Servicemen	407	400	103
11. TOTAL, SHORT SERVICE ENGAGEMENTS	1,042	1,328	885
12. TOTAL, RECRUITED ON NORMAL REGULAR AND SHORT SERVICE ENGAGEMENTS (MEN AND BOYS)	26,353	53,205	42,680

NOTE—

(*a*) The table excludes a very small number (21 in 1952 and 17 in 1953) who were recruited on a special Northern Ireland engagement corresponding with the period of national service in Great Britain. Other recruits from Northern Ireland joining on engagements applicable in Great Britain are included in the figures.

Vote	Service	Estimates, 1954–55		
A	Maximum number of officers and other ranks to be maintained for Army Service			549,000
		Gross Estimate	Appropriations in aid	Net Estimate
		£	£	£
1	Pay, etc., of the Army	138,050,000	14,970,000	123,080,000
2	Reserve Forces, Territorial Army, Home Guard and Cadet Forces	21,490,000	180,000	21,310,000
3	War Office	3,250,000	50,000	3,200,000
4	Civilians	64,050,000	1,310,000	62,740,000
5	Movements	35,390,000	940,000	34,450,000
6	Supplies, etc.	71,030,000	17,990,000	53,040,000
7	Stores	225,000,000	41,000,000(*a*)	184,000,000(*a*)
8	Works, buildings and lands ..	35,120,000	4,420,000	30,700,000
9	Miscellaneous effective services	11,520,000	8,000,000	3,520,000
10	Non-effective services	19,200,000	240,000	18,960,000
11	Additional married quarters ..	4,400,100	4,400,000	100
	Total .. .. £	628,500,100	93,500,000(*a*)	535,000,100(*a*)

(*a*) The appropriations in aid for 1954–55 include £26,000,000 to be granted as Mutual Defence Assistance by the United States of America in connection with expenditure on warlike stores. The net total of Army Estimates, 1954–55, before deducting this sum is £561,000,100. The comparable figures for Army Estimates 1953–54 were £55,000,000 and £581,000,100 respectively.

Estimates, 1953–54			Difference on Net Estimates	
		554,000	Decrease 5,000	
Gross Estimate	Appropriations in aid	Net Estimate	Increase	Decrease
£ 139,390,000	£ 13,100,000	£ 126,290,000	£ —	£ 3,210,000
18,470,000	180,000	18,290,000	3,020,000	—
3,070,000	50,000	3,020,000	180,000	—
61,280,000	1,190,000	60,090,000	2,650,000	—
35,420,000	350,000	35,070,000	—	620,000
67,973,000	14,260,000	53,713,000	—	673,000
243,897,000	68,500,000(*a*)	175,397,000(*a*)	8,603,000	—
36,560,000	4,160,000	32,400,000	—	1,700,000
7,080,000	3,260,000	3,820,000	—	300,000
18,130,000	200,000	17,910,000	1,050,000	—
5,500,100	5,500,000	100	—	—
636,770,100	110,770,000(*a*)	526,000,100(*a*)	15,503,000	6,503,000

Net increase £9,000,000

ANTONY HEAD
J. R. H. HUTCHISON

JOHN HARDING, *C.I.G.S.*
C. G. G. NICHOLSON, *A.G.*
O. L. ROBERTS, *Q.M.G.*
H. REDMAN, *V.C.I.G.S.*
A. D. WARD, *D.C.I.G.S.*

G. W. TURNER

THE WAR OFFICE,
February 11, 1954

MEMORANDUM OF THE SECRETARY OF STATE FOR AIR TO ACCOMPANY AIR ESTIMATES, 1954–55

(Cmd. 9076)

PREFACE

1. THE NET total of Air Estimates for 1954–55 is £491,640,000, compared with £498,000,000 for 1953–54.

2. This allows for our receiving £45,360,000 out of the aid given by the United States of America towards the defence burden undertaken by the United Kingdom. The corresponding figure in 1953–54 was £50,000,000.

3. Without allowing for American aid the comparison is therefore between £537,000,000 for 1954–55 and £548,000,000 in 1953–54.

4. The reason for this difference is that, though we aim to spend more in 1954–55 on aircraft and armament and on petrol, we shall be spending considerably less on other equipment and stores and on works. The main differences in gross expenditure are:

(*a*) Aircraft and Armament—an increase of £20,250,000.
(*b*) Other Equipment and Stores—a decrease of £19,500,000.
(*c*) Petrol and Oil—an increase of £4,750,000.
(*d*) Works and Married Quarters—a decrease of £11,380,000 (after allowing for £4,000,000 which we plan to draw from the Armed Forces Housing Loan).

5. The main reasons for the increase in spending on aircraft and armament are that we have made provision for large deliveries of Swift and Hunter fighters during the year, as well as for the first deliveries of Valiant medium bombers; and we are allowing for the first time for some atomic bombs (*see* Cmd. 8986). The increase will in fact be larger than comparison of the two estimates suggests. In 1953–54 we shall be spending less than we estimated, because production has not come up to expectations. Another factor which distorts the comparison is that the 1953–54 Estimates included a sum of about £13,000,000 for payments to contractors for work done on orders which were cancelled as a result of the change in the defence programme: these payments have not yet all been made and some allowance has had to be made for them in the Estimates for 1954–55, but it is a smaller one (£10,000,000, including £7,500,000 carried over from 1953–54).

6. Expenditure on other equipment and stores shows, as I have said, a big reduction. For example, we are asking for £5,500,000 less for materials and miscellaneous equipment (such as tools, aircraft handling equipment and parachutes), £1,800,000 less for lorries and cars, and £1,800,000 less for instruments. Part of the reduction is the incidental fluctuation that occurs between one year and another; the rest is due to our having made good progress in meeting our needs in earlier years.

7. We are asking £29,750,000 for radio, radar and electrical equipment. This represents a reduction of £12,250,000 on the £42,000,000 asked for in 1953–54. In effect, the reduction is somewhat less, because we shall have

spent in the current year no more than £34,000,000. Although our sights last year were thus set too high, we have in fact made good progress in introducing new equipment, especially for the radar chain in this country. I should expect that in future years we shall have to ask for more, because several important new types of radar and radio are at present in the laboratory and will begin to reach the production bench during the next few years.

8. The reason why more money is needed for petrol and oil is that the force is growing and is flying more intensively; and also that more jet flying is being done on low-grade petrol, which is dutiable, and less on kerosene, which is not. No less than £38,000,000 is allowed in 1954–55 for duty on petrol, all of which returns to the Exchequer. The increase in the money needed would have been still more if there had not been a slight fall in prices.

9. In the Works programme, the reduction as compared with 1953–54 is a good deal less than it appears, since a considerable proportion of the money voted in 1953–54 will not be spent. This is partly because a number of projects have been cancelled and others delayed during last year as a result of the review of defence requirements; and there have also been changes in the programme of works for the United States Air Force.

10. The Estimate includes about £19,000,000 for new works and maintenance of airfields, etc., for the United States Air Force, and allows for receipts of about £16,000,000 from that force as contribution towards the costs. A new agreement has been concluded with the United States Government which provides for an extended programme of works services for the U.S.A.F. and for revised financial arrangements.

11. The Armed Forces (Housing Loans) Act of 1953 has enabled us to provide for drawing up to £4,000,000 from the Consolidated Fund, for married quarters. There was no similar borrowing in 1953–54, because the Air Force share of the money provided under the Act of 1949 was almost exhausted.

12. Finally, the number of officers and airmen allowed for is less than in 1953–54, in spite of the fact that the front line of the force will be expanding and receiving new and more complex equipment. The reason is mainly that the flying training organisation, which was greatly enlarged in the intial stages of the expansion programme, can now be somewhat contracted. The continued search for economy in manpower has also contributed to the reduction.

13. 1954–55 is the seventh year since normal accounting was resumed after the war, and I thought at this stage it might be helpful to include (as an Appendix to this Memorandum) graphs showing the trend of air expenditure and the proportions in which it has been distributed between its main elements.

GENERAL

14. During the coming year there will again be an increase in the size and effectiveness of the front line of the Royal Air Force. Fighter Command now has its first British swept-wing fighters. The year will see a steady increase in the rate of re-equipment with Swifts and Hunters.

15. The re-equipment and expansion of Bomber Command will continue during the next twelve months.

16. We have to see that all the details of our operational system are

adapted to make the best of the new types of aircraft that are to come into service. This is an immense task and great progress has already been made in fields less noticeable, but not less important, than the new aircraft themselves. For example, the increased altitude of modern air battle creates special problems. Mud on an aircraft undercarriage freezes at great heights and has not thawed out when the aircraft comes down to refuel. Thus, one of the reasons for having solid platforms for servicing and at the end of runways is to avoid the mud that would otherwise freeze and jam undercarriages. All our fighter airfields have now been so equipped. In the vast spaces of the sky modern bombers can only be intercepted by fighters which are guided by a complex and up-to-date system of radar control from the ground. Thus, nothing is more important for our air defence organisation than the work that has been done to increase the efficiency of radar control. Because the modern bomber can go extremely fast and change its direction very rapidly, we have, as well, speeded up the whole of our ground organisation and made changes in the system of command to match the needs of operations that may often be conducted above the speed of sound.

17. Many, if not all, of these changes and improvements are taking place with the prospect of guided weapons coming over the horizon. The past year has seen the successful testing of experimental rockets at Woomera in Australia. These trials foreshadow the most important developments in air defence since the invention of radar. The first of these weapons will be launched from piloted fighters; they will eventually replace the aircraft cannon. And when the first ground-launched weapons are introduced they will supplement, and not supplant, the piloted aircraft.

18. Coastal Command's re-equipment and expansion has continued. Further expansion will take place in the coming year. Sunderlands were used to take relief supplies from Malta to the Ionian Islands after the disastrous Greek earthquake. They also helped to supply the British North Greenland Expedition.

19. The Second Tactical Air Force on the Continent, which combines with the contingents of the Netherlands and Belgium to form the Second Allied Tactical Air Force, is completing its re-equipment with Venom fighter ground attack aircraft in place of Vampires. It has also received its full complement of Sabre fighter/interceptors from Canada and the United States. The ferrying of these several hundred aircraft across the Atlantic is itself a notable feat. Our contribution to the Supreme Allied Commander's Continental air strength will again increase during the coming year.

20. An air force is only really efficient and valuable if it is continually flying. Besides the training of individual pilots, aircrews and squadrons, several large scale exercises have taken place in the past year, to test the whole machinery of air warfare. "Momentum" was an exercise over ten days to test the defences of the United Kingdom. "Jungle King" was an exercise involving a period of intensive operations to test the effectiveness of Bomber Command's organisation and training. "Mariner" was a combined exercise for the ships and aircraft of all N.A.T.O. powers; and "Coronet" was to test Allied Air Forces, Central Europe. Smaller exercises were held at regular intervals. These exercises have taught many important lessons on the administrative side in meeting the supply

problems of international forces. The coming year will see a continuation of this training.

21. Transport Command is carrying on its diverse tasks. In the past year a notable achievement has been the transport, in conjunction with civil aircraft, of large reinforcements of troops to Kenya in April and September. In addition to bringing Sabres across the Atlantic, the Command ferries large numbers of aircraft to overseas Commands. A special flight was formed to work in Australia on the atomic weapon trials. The airborne forces of the Army have been exercised; in the Spring the Command will be engaged on a large scale in a further similar exercise.

22. Last July, the Royal Air Force was reviewed by Her Majesty The Queen in celebration of her Coronation. Commonwealth air forces were represented in the ceremonies which culminated in a fly past of 640 aircraft. Forty-nine formations flying at speeds varying from under 100 m.p.h. to over 650 m.p.h. flew over the Royal dais at Odiham at intervals of 30 seconds. This demanded the highest standards of airmanship, ground control and staff planning.

23. During the year the Canberra had some notable achievements to its credit. An aircraft of this type, fitted with Olympus engines undergoing trials, regained the world altitude record. On Coronation Day, Royal Air Force Canberras flew the television film across the Atlantic for display the same night in Canada and the United States. A Royal Air Force Canberra won the London–New Zealand Air Race, going half-way round the world in a day; and in December, in little over half a day, another Canberra reached Capetown. Fifty years after the Wright brothers' first flight at Kitty Hawk, the scene was visited by a Canberra which left Northern Ireland in the morning and arrived at its destination by local lunch-time, within a few seconds of its scheduled time. We hope to arrange further overseas visits by Canberras from Bomber Command squadrons during the coming year.

24. The Middle East Air Force, besides the normal training of Royal Air Force, Royal Australian Air Force, and Royal New Zealand Air Force squadrons, has been giving vigorous support to the ground security forces in Kenya, first by the formation of a special flight of Harvard aircraft and later in the year, by the use of Lincoln bombers to harass Mau Mau terrorists in thick forests and drive them into areas where they can be more easily dealt with on the ground. Reconnaissance has been maintained over territories under British protection on the Trucial Coast of the Persian Gulf. For the Far East Air Force the Korean Armistice has brought a diminution of the flying-boat activities over the waters of the Tsuschima Straits, but in Malaya air activity in all forms has been doubled. The inaccuracy of local maps, which frequently led to the mis-reporting of terrorist positions, has been remedied by a complete air survey of Malaya by the Royal Air Force. The helicopters of No. 848 Royal Naval Squadron, operating with the Royal Air Force, have often saved infantry from exhausting jungle marches of many days. Royal Air force helicopters will take over these duties later this year.

25. The speed, height, range and navigational techniques of aviation in the jet age differ markedly from conditions of flight in piston-engined aircraft. Jet aircraft are not more difficult to fly, but experience has shown that the earlier in his training a pilot can fly in jet aircraft, the sooner he will

assimilate the new techniques. In the coming year, for the first time, new pilots will gain their wings on jet aircraft after a comparatively short time on a piston-engined type.

26. We have found that flight simulators can give aircrew, in very many aspects of handling an aircraft, as good training as would be obtained by actual flying. This particularly applies to the co-ordination of action by various members of the crew. With the introduction of the jet medium bomber we shall be introducing V-class flight simulators, which cost much less to buy and to operate than the actual aircraft. Pilots, after training in these simulators, have found it hard to realise that they have not actually been flying.

27. The Royal Air Force continues to derive great advantages from the aircrew training which the Canadian government provides for the nations which are members of N.A.T.O.

28. For seven years we have been training pilots and navigators in the Air Training Group in Southern Rhodesia. The Group has now been disbanded and I should like to express our gratitude for all the help and kindness the Royal Air Force has received in Southern Rhodesia.

29. The development of electronics and the employment of radar have not out-moded the Royal Observer Corps, which has been re-organised to coincide territorially with the operational pattern of Fighter Command. Many posts have been re-sited and the area covered by the Corps has been extended to Northern Ireland.

PERSONNEL

30. There has been during 1953 a slight contraction in total numbers. Between May and the end of December, 1953, the total strength fell from 278,300 to 271,500 and is expected to fall still further to 267,300 by April of this year. During the next financial year it will remain fairly steady and is estimated to be 269,200 by the end of the financial year. The proportion of National Service men will continue to decrease provided that there is no serious decline in the numbers who sign on for short regular engagements as an alternative to National Service.

31. The expansion in the regular content of the Royal Air Force which has taken place since the outbreak of the Korean war in 1950 has been achieved almost entirely by an increase in the numbers of airmen serving on short regular engagements of three and four years. These men are now leaving the Royal Air Force in large numbers, and this will impede the building-up of the average level of experience. One of our most important tasks in 1954 and beyond must be to build up the level of experience, particularly in advanced tradesmen, and this can only be done by persuading much larger numbers of men to sign on for longer engagements.

32. Our problem is most difficult in the engineering trades. Men with the skill and experience which the Royal Air Force needs and produces are also in great demand for civilian industry. The method on which the Royal Air Force has long relied for its most skilled tradesmen is the apprentice scheme, under which training is provided for long-service regular airmen at Halton and Locking. For many years, however, we are bound to suffer from the substantial reduction in apprentice entries during the war and the very low post-war entries. To meet the serious deficiencies which began to show themselves during 1952 we were compelled to adopt

the expensive expedient of giving advanced training to airmen serving on three or four year engagements. As a result, we are now, in most advanced trades, within sight of providing the numbers of airmen we need, but we cannot regard this as a permanent solution to our manning problem because it places a heavy burden on Technical Training Command and produces tradesmen who leave the Royal Air Force at a time when they are becoming most useful. Furthermore, the proportion of really experienced men in these advanced trades has been steadily decreasing for some time. Above all, it is essential that advanced tradesmen on short engagements, to whom we have given expensive technical training, stay longer in the Service and that youths with intelligence and mechanical aptitude come forward in good numbers to the apprentice schools at Halton and Locking.

33. No less serious is our need for more pilots and navigators. The figures for 1953 are, on the whole, disappointing; little more than half the pilots needed, and even a lower proportion of navigators, have joined the Service. This is, however, attributable in part to the raising of standards of selection, and the wastage rate in training for the 1953 entries has been so far very much lower than in preceding years. We can take some encouragement that in 1953 a far large proportion of short-service aircrew entered on engagements for the maximum eight-year period. The process of training a pilot or navigator is so expensive that the Royal Air Force can only afford to give full operational training to officers who are likely to remain available for front-line service for a substantial period. So our aim will be to offer to the majority of entrants who satisfactorily complete pilot or navigator training the possibility of a pensionable career in the Royal Air Force, with an extension of the period devoted to active flying.

34. In the preceding paragraphs I have set out plainly some of the pressing personnel difficulties facing the Royal Air Force. These difficulties, however, are not greater than those which have been overcome in the past. They have not been allowed to divert the Royal Air Force from its main task. It is greatly to the credit of the officers, airmen, and airwomen of the Service that the number of hours flown by operational squadrons was nearly 20 per cent. higher in 1953 than in 1952.

RESERVES POLICY

35. During the past year, the Air Council have given much thought to the problem of increasing the readiness of the Royal Air Force to operate effectively in the opening hours or days of war. It is now more important than ever that mobilisation plans should provide adequate reserves of men who are able to play their part immediately. That means, in the first instance, the direction of the major reserve training effort to first-line reserves who would require no further training on mobilisation.

36. This concept involves the concentration of available training resources on those reserve aircrew who can, in the limited flying time available to them, be maintained at the high standard of efficiency necessary for safe and efficient operational flying. It also entails a major reorganisation of the reserve ground forces, under which certain regular units will be allotted a number of reservists who will be trained by those units in peace as their immediate reinforcement in war. On mobilisation these reservists would go straight to their war stations instead of passing through mobilisation centres. A start has been made with these arrangements in the Control

and Reporting Units of Fighter Command and, as soon as possible, they will be extended to the rest of Fighter Command, to Bomber Command, and such other home Commands where experience shows it to be necessary.

37. Now that it is our aim to concentrate reserve flying training resources on maintaining a smaller aircrew reserve at a much higher standard of efficiency, there will be no further need for the remaining civil-operated Reserve Flying Schools. The decision to close these schools, which have given most valuable service to the Royal Air Force over a period of years, is much to be regretted, but it is inescapable.

WORKS

38. The most important progress we have made during the past year has been to complete all but a small proportion of the works services needed for restoring the Control and Reporting System, which is the basis of the air defence of the United Kingdom. Next year we shall only have a few installations to complete, together with some improvements needed for the latest types of equipment.

39. For the V-bomber force we are making our runways longer and stronger and are providing new bomb storages and an improved system for the storage and distribution of fuel. Work is well in hand on some of these airfields, and others will be started in the next two years.

40. Other airfields are being altered to take advanced types of aircraft. We are installing modern airfield lighting, and providing new armouries for the weapons which will be carried by our latest fighters.

41. We are building two new explosive depots. The use of these new depots will lead to increased efficiency and economy in the storage, handling and distribution of explosives and will enable us to clear most, if not all, of the stocks still scattered on isolated sites. We have made special arrangements to store the atom bombs which are now being delivered to the Royal Air Force, but I do not propose to disclose exactly how or where. I can say, however, that the storage of atom bombs will cause no particular safety problems.

42. For many of our works services we have had to acquire more land. The jet engine has made possible rapid progress in the performance of aircraft, involving heavier equipment and much greater bomb-carrying capacity. This means that we must have bigger airfields for the effective exercise of modern air power. Consequently, the pre-war and war-time bases of the Royal Air Force, in which substantial capital has been invested, would be useless without extension. It is not possible to forecast future trends exactly, but it does at present seem unlikely that the next phase of technical development will result in corresponding increases in requirements. Meanwhile, no single acre of land is taken without the closest scrutiny of the justification for it, and without discussion with the Ministry of Agriculture and the other Departments concerned.

43. Our plans for building new married quarters at home had to be temporarily slowed down pending the extension of the Armed Forces (Housing Loans) Act, 1949, by the Armed Forces (Housing Loans) Act, 1953. During the current year 1,600 married quarters will have been completed; we plan to start a further 2,500 next year. The corresponding figures overseas are 120 and 260.

AIR MOVEMENTS

44. Air trooping is now a well established means of Service movement. During the past year approximately 90 per cent. of all troop movements to the Middle East were made by air. Special contracts were let as well for trooping to the Far East, when troopships had been diverted to other duties. We shall be continuing air trooping to the Middle East and fresh tenders will be invited for the contracts due to expire in the Spring of this year. In addition, we are planning for the first time to institute a regular air trooping service to the Far East. We should like to introduce into trooping service later on some of the new passenger aircraft now under development, and are examining in detail possible ways in which this could be done.

SUPPLY

45. A period of rapid technical progress brings many problems in its train. With modern aircraft, development has to continue while the process of production goes on. This is the background to the delays in the deliveries of new types of aircraft and equipment to the Royal Air Force, to which I have already referred. Certainly, we impose exacting standards in design and manufacturing technique of our new equipment in order to meet modern operational requirements.

46. The pace of technical development and the increasing complexity of the most modern equipment will mean that over the next few years expenditure on the re-equipment of the Royal Air Force will be on a rising curve if we are to achieve our aim and fulfil our plans.

METEOROLOGY

47. During the year, meteorological information has been made available to the public in several more ways. A new method of presenting weather charts and forcasts by television has been started. Warnings of persistent fog in industrial areas are now broadcast by the British Broadcasting Corporation; and the Meteorological Office is making its contribution to the new system of flood warnings for the East Coast which has been introduced by the authorities concerned.

48. Experiments are taking place in order to determine the practical advantages to be gained from the use of a new type of British machine which can transmit weather charts in facsimile between the Central Forecasting office and airfields in much the same way as photographs can be transmitted by wireless for use in newspapers.

49. Research has been done on the use of electronic computing machines to help in general weather forecasting. Further studies have been made into matters essential for modern high-speed, high-level operations, such as the structure of jet streams and thunderstorm clouds, clear air turbulence, and ice formation on aircraft. Operational trials have been made with new ground and airborne equipment, which will provide observations of winds, temperatures, and humidities to heights of over 80,000 feet.

DE L'ISLE AND DUDLEY

AIR MINISTRY,
February 17, 1954.

Vote	Service	Estimates, 1954–55		
	Maximum number of officers, airmen and airwomen to be maintained for Air Force Service			288,000
		Gross Estimate	Appropriations in aid	Net Estimate
		£	£	£
1	Pay, etc., of the Air Force ..	89,180,000	2,830,000	86,350,000
2	Reserve and Auxiliary services	2,181,000	1,100	2,179,900
3	Air Ministry	4,347,000	157,000	4,190,000
4	Civilians at outstations ..	32,463,000	3,893,000	28,570,000
5	Movements	13,230,000	930,000	12,300,000
6	Supplies	102,910,000	7,070,000	95,840,000
7	Aircraft and Stores	267,000,000	67,360,000(*a*)	199,640,000(*a*)
8	Works and lands	70,700,000	19,200,000	51,500,000
9	Miscellaneous effective services	8,790,000	2,820,000	5,970,000
10	Non-effective services ..	5,400,000	300,000	5,100,000
11	Additional Married Quarters ..	4,000,100	4,000,000	100
	Total .. .. £	600,201,100	108,561,100(*a*)	491,640,000(*a*)

(*a*) The appropriations in aid for 1954–55 include £45,360,000 to be granted as Mutual Defence Assistance by the United States of America in connection with expenditure under certain subheads of Vote 7 (*see* pp. 128 and 129). The net total of Air Estimates, 1954–55, before deducting this sum is £537,000,000. The comparable figures for 1953–54 were £50,000,000 and £548,000,000, respectively.

(*b*) Exclusive of Supplementary Estimate of £10 (H.C. 77 of 1953–54).

Estimates, 1953–54		Differences on Net Estimates
	302,000	Decrease 14,000

Gross Estimate	Appropriations in Aid	Net Estimate	Increase	Decrease
£	£	£	£	£
88,190,000	2,620,000	85,570,000	780,000	—
1,691,000	1,000	1,690,000	489,900	—
4,097,000	117,000	3,980,000	210,000	—
29,480,000	2,550,000	26,930,000	1,640,000	—
13,700,000	1,000,000	12,700,000	—	400,000
97,890,000	7,410,000	90,480,000	5,360,000	—
266,250,000	71,000,000	195,250,000	4,390,000	—
86,080,000	16,080,000	70,000,000	—	18,500,000
8,890,000	2,080,000	6,810,000	—	840,000
4,850,000	260,000	4,590,000	510,000	—
—	—	—	100	—
601,118,000	103,118,000	498,000,000(*b*)	13,380,000	19,740,000

Net Decrease £6,360,000

DE L'ISLE AND DUDLEY
GEORGE WARD

W. F. DICKSON
F. J. FOGARTY
J. WHITWORTH JONES
R. IVELAW-CHAPMAN
T. G. PIKE
J. W. BAKER

J. H. BARNES

AIR MINISTRY,
February 9, 1954.

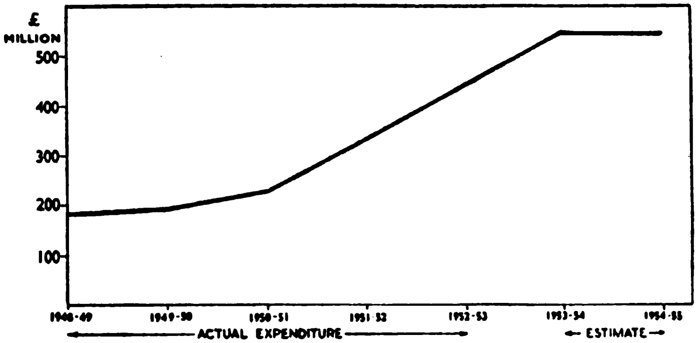
STATEMENT OF THE TOTAL ESTIMATED EXPENDITURE FOR AIR SERVICES INCLUDING AMOUNTS PROVIDED IN THE CIVIL AND REVENUE DEPARTMENTS' ESTIMATES

	1954–55	1953–54
	£	£
Air Estimates:		
Estimated Expenditure (after deducting Appropriations in Aid)	491,640,000	498,000,000 (*a*)
Civil Estimates: Estimated Expenditure under:		
Class I, Vote 4.—Paymaster General's Office ..	5,700	4,800
,, I, ,, 9.—Exchequer and Audit Department	38,950	15,780
,, I, ,, 12.—Government Chemist	60	60
,, I, ,, 14.—The Mint (manufacture of medals)	2,500	1,200
,, III, ,, 13.—Law Charges	17,900	13,100
,, III, ,, 22.—Law Charges and Courts of Law, Scotland	1,850	1,550
Ministry of Works:		
,, VII, Votes 1 and 3.—Maintenance, furniture, fuel and light and miscellaneous expenses ..	444,000	300,000
Estimated rental values	450,000	356,000
Carried forward .. £	492,600,960	498,712,490

(*a*) Exclusive of Supplementary Estimate of £10 (H.C. 77 of 1953–54).

APPENDIX

NET AIR EXPENDITURE, 1948–49 to 1954–55

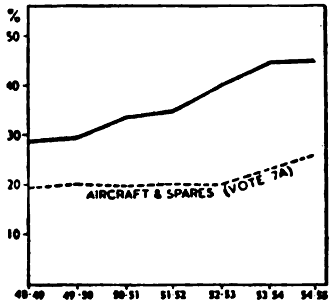


NOTE.—The above graph includes expenditure met from:

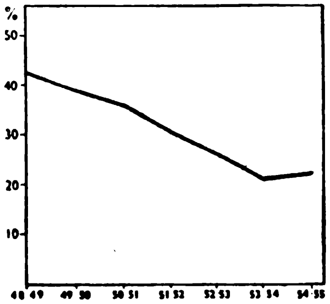
(*a*) funds arising from Mutual Defence Assistance by the United States of America;
(*b*) sums issued out of the Consolidated Fund, under the Armed Forces (Housing Loans) Acts, for the construction of married quarters.

MAIN HEADS OF EXPENDITURE AS PERCENTAGES OF TOTAL EXPENDITURE

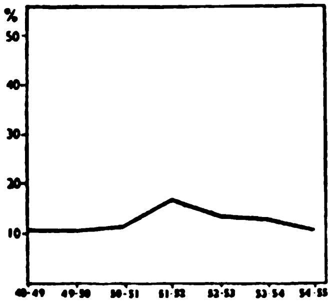
Aircraft & Stores (Vote 7)



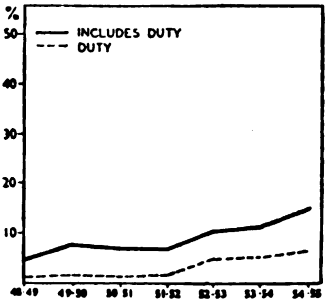
Pay, etc., of Service Personnel & Civilians (Votes 1, 2, 3 & 4)



Works (Votes 8 & 11)



Petrol, Oil, etc. (Vote 6C)



SERVICE EMOLUMENTS

(Cmd. 9088)

1. IN THE last two Statements on Defence (Cmds. 8768 and 9075) it has been stressed that, in order to remedy the shortage of N.C.Os. and skilled tradesmen and to maintain the operational mobility and technical efficiency of the Services, there must be an improvement in the numbers prolonging their current engagements.

2. Equally, there must be adequate numbers of medium and long term regulars if full advantage is to be obtained from national service and if proper use is to be made of modern weapons and equipment with their ever-increasing complexity.

3. At the present time the Services are neither attracting sufficient numbers on long-term initial engagements, nor inducing enough of those on the shorter regular engagements to continue in the Forces when their initial engagement expires. Her Majesty's Government have accordingly again reviewed the whole position, which was last reviewed in 1950, and they have had regard to the opportunities in civilian life and to the attractions of civil employment to those now serving in the Forces, especially those with aptitude and experience whom the Services particularly wish to retain.

4. As a result of this review the Government have decided that selective improvements should be made in the pay structure of the Services. These improvements are designed to give increased recognition to long service, skill and experience.

5. Each Service has somewhat differing problems and requirements and there are, therefore, some variations in the form and incidence of the improvements. The cumulative effect, however, of the increases in each Service is broadly the same.

6. In the case of other ranks the changes take the form of improved pay for N.C.Os. and technicians, and of better inducements to prolong service.

7. In the case of officers, the increases cover the middle range, i.e. from Army Captains of four years' seniority to Brigadiers, and equivalents in the other Services. It is within this range that the present conditions of service life press most hardly on officers, particularly those with family responsibilities.

8. Since the object of these proposals is to increase the number of experienced regulars, it is not proposed to extend them to national service personnel.

9. These improvements will take effect from 1st April, 1954. Details are set out in the Appendix.

[*The Appendix sets out in detail the pay increases for Officers and men, ranging from 7/- a day for Captains, R.N., Colonels, Group Captains, Brigadiers and Air Commodores down to 2/- a day for Leading Seamen and equivalent ranks in the Army and R.A.F.; the increments of pay for length of service; the re-engagement bonuses; and other benefits now introduced.*

The effect of these increases is shewn in Tables I to VI which follow.]

TABLE I

NEW RATES OF BASIC PAY FOR OFFICERS

Royal Navy and Royal Marines

General List

Rank	Daily		Annual
	s.	d.	£
Lieutenant—			
after 4 years and equivalent rank, R.M.	34	0	621
,, 6 ,, ,, ,, ,, ,,	36	0	657
Lieutenant Commander and equivalent rank, R.M.	44	0	803
after 2 years and equivalent rank, R.M.	46	0	840
,, 4 ,, ,, ,, ,, ,,	48	0	876
,, 6 ,, ,, ,, ,, ,,	50	0	913
,, 8 ,, ,, ,, ,, ,,	53	0	967
,, 10 ,, ,, ,, ,, ,,	55	0	1,004
Commander and equivalent rank, R.M.	61	6	1,122
after 2 years and equivalent rank, R.M.	64	0	1,168
,, 4 ,, ,, ,, ,, ,,	66	6	1,214
,, 6 ,, ,, ,, ,, ,,	69	0	1,259
,, 8 ,, ,, ,, ,, ,,	71	6	1,305
Captain and equivalent rank, R.M.	80	0	1,460
after 2 years and equivalent rank, R.M.	83	0	1,515
,, 4 ,, ,, ,, ,, ,,	86	0	1,570
,, 6 ,, ,, ,, ,, ,,	89	0	1,624
,, 8 ,, ,, ,, ,, ,,	92	0	1,679

Branch List

Rank	Daily		Annual
	s.	d.	£
Commissioned Officer on promotion and equivalent Commissioned Officer rank, R.M.	28	0	511
after 2 years and equivalent Commissioned Officer rank, R.M.	29	0	529
,, 4 ,, ,, ,, ,, ,, ,, ,,	30	0	548
,, 6 ,, ,, ,, ,, ,, ,, ,,	31	0	566
,, 8 ,, ,, ,, ,, ,, ,, ,,	33	0	602
Senior Commissioned Officer on promotion and equivalent Commissioned Officer rank, R.M.	35	6	648
after 2 years and equivalent Commissioned Officer rank, R.M.	36	6	666
,, 4 ,, ,, ,, , ,, ,, ,,	37	6	684
,, 6 ,, ,, ,, ,, ,, ,, ,,	38	6	703
,, 8 ,, ,, ,, ,, ,, ,, ,,	39	6	721
,, 10 ,, ,, ,, ,, ,, ,, ,,	40	6	739
Lieutenant on promotion and equivalent Commissioned Officer rank, R.M.	42	6	776
after 2 years and equivalent Commissioned Officer rank, R.M.	44	0	803
,, 4 ,, ,, ,, ,, ,, ,, ,,	45	6	830
,, 6 ,, ,, ,, ,, ,, ,, ,,	47	0	858
Lieutenant Commander on promotion and equivalent Commissioned Officer rank, R.M.	48	6	885
after 2 years and equivalent Commissioned Officer rank, R.M.	50	6	922
,, 4 ,, ,, ,, ,, ,, ,, ,,	52	6	958

TABLE II

NEW RATES OF BASIC PAY FOR OFFICERS

ARMY

Normal Rates

Rank	Daily		Annual
	s.	d.	£
Captain—			
after 4 years	37	0	675
,, 6 ,,	39	0	712
Major	47	0	858
after 2 years	49	0	894
,, 4 ,,	51	0	931
,, 6 ,,	53	0	967
Lieutenant Colonel—			
with less than 19 years' service	61	6	1,122
after 2 years or with 19 years' service	64	0	1,168
,, 4 ,, ,, ,, 21 ,, ,,	66	6	1,214
,, 6 ,, ,, ,, 23 ,, ,,	69	0	1,259
,, 8 ,, ,, ,, 25 ,, ,,	71	6	1,305
Colonel	80	0	1,460
after 2 years	83	0	1,515
,, 4 ,,	86	0	1,570
,, 6 ,,	89	0	1,624
Brigadier	92	0	1,679

Quartermaster Rates

Rank	Daily		Annual
	s.	d.	£
Lieutenant	29	0	529
after 2 years' service	31	0	566
,, 4 ,, ,,	33	0	602
Captain—			
after 6 years' service	37	0	675
,, 8 ,, ,,	39	0	712
,, 10 ,, ,,	41	0	748
Major—			
after 12 years' service	46	0	840
,, 14 ,, ,,	48	0	876
,, 16 ,, ,,	50	0	913
,, 18 ,, ,,	52	0	949
Lieutenant Colonel	57	0	1,040

TABLE III

NEW RATES OF BASIC PAY FOR OFFICERS

Royal Air Force

General Duties Branch

Rank	Daily s.	Daily d.	Annual £
Flight Lieutenant			
after 4 years	37	0	675
,, 6 ,,	39	0	712
,, 8 ,,	41	0	748
Squadron Leader	47	0	858
after 2 years	49	0	894
,, 4 ,,	51	0	931
,, 6 ,,	53	0	967
Wing Commander	61	6	1,122
after 2 years	64	0	1,168
,, 4 ,,	66	6	1,214
,, 6 ,,	69	0	1,259
,, 8 ,,	71	6	1,305
Group Captain	80	0	1,460
after 2 years	83	0	1,515
,, 4 ,,	86	0	1,570
,, 6 ,,	89	0	1,624
Air Commodore	92	0	1,679

Note.—Increases comparable with those given to officers of the General Duties branch will be given to officers of other branches whose rates of pay are identical with those of the General Duties branch, to Legal officers, Education officers, Medical Technicians and Directors of Music. The increases given to Branch officers of the Royal Air Force will be broadly similar to those for other officers quoted above.

TABLE IV

NEW WEEKLY RATES OF BASIC PAY FOR RATINGS AND OTHER RANKS

ROYAL NAVY AND ROYAL MARINES

Where several different rates of pay are indicated, Rate D is for the man with the lowest qualification, Rate C for a higher qualification, and so on.

Length of Service Pay and Badge Pay (see sub-paragraphs 2 and 4 of Section B above) are payable in addition.

Seaman Branch and Royal Marines (General Duties)

Rating	D	C	B	A
	s. d.	s. d.	s. d.	s. d.
Leading Rating	98 0	105 0	108 6	112 0
Petty Officer	—	136 6	140 0	143 6
Chief Petty Officer	—	154 0	161 0	168 0
Quartermaster Sergeant R.M... ..	—	—	—	182 0
Regimental Sergeant-Major	—	—	—	192 6

Royal Marine Tradesmen

Rank	C	B	A
	s. d.	s. d.	s. d.
Corporal	105 0	108 6	112 0
Sergeant	—	140 0	143 6
Colour Sergeant	—	161 0	168 0
Quartermaster Sergeant	—	—	182 0
Regimental Sergeant-Major..	—	—	192 6

R.N. (Other Branches) and Royal Marine Buglers

Rating or rank	B	A
	s. d.	s. d.
Leading rating and equivalent rank, R.M.	105 0	112 0
Petty Officer and equivalent rank R.M.	140 0	143 6
Chief Petty Officer and equivalent rank R.M. ..	161 0	168 0

Artificers

Rating	
	s. d.
Artificer, 5th Class (Leading Rating)	105 0
Artificer, Acting 4th Class (Acting Petty Officer)	147 0
Artificer, 4th Class (Petty Officer)	150 6
Artificer, 3rd Class (Chief Petty Officer)	171 6
Artificer, 2nd Class Artificer, 1st Class } (Chief Petty Officer)	178 6
Chief Artificer (Chief Petty Officer)	192 6

Mechanicians

Rating	
	s. d.
Mechanician, 3rd Class Mechanician, 2nd Class (Petty Officer)	143 6
Mechanician, 1st Class (Chief Petty Officer)	168 0
Mechanician, 1st Class (C.P.O.)—after 3 years as Mechanician	175 0
Mechanician, 1st Class (C.P.O.)—after 5 years as Mechanician	178 6
Chief Mechanician (Chief Petty Officer)	192 6

Artisans (Blacksmiths, Joiners, Painters and Plumbers)

Rating	
	s. d.
Artisan, Acting 4th Class (Leading Rating)	105 0
Artisan, 4th Class (Leading Rating)	112 0
Artisan, 3rd Class Artisan, 2nd Class (Petty Officer) Artisan, 1st Class	143 6
Chief Artisan (Chief Petty Officer)	168 0

TABLE V

NEW WEEKLY RATES OF BASIC PAY FOR OTHER RANKS

ARMY

Lance Corporals and Corporals

Rank	1 Star	2 Star	3 Star	4 Star	5 Star	6 Star	7 Star
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Lance Corporal	73 6	77 0	84 0	87 6	94 6	101 6	112 0
Corporal	91 0	94 6	101 6	105 0	108 6	115 6	126 0

Sergeants and Higher Ranks

Rank	Group 'X' Class I	Group 'A' Class I	Group 'B' Class I	Others
	s. d.	s. d.	s. d.	s. d.
Sergeant	157 6	147 0	143 6	136 6
Staff Sergeant	182 0	171 6	161 0	154 0
Warrant Officer II (other than R.Q.M.S.)	196 0	185 6	178 6	171 6
Warrant Officer II (R.Q.M.S.)	203 0	192 6	185 6	178 6
Warrant Officer I	210 0	199 6	192 6	185 6

Notes: (i) The increments for service and service in the rank, shown in paragraph 2 of Section 'C' above, are payable in addition.

(ii) A new weekly rate of 94s. 6d. will also be introduced for Privates (7 star).

TABLE VI

NEW WEEKLY RATES OF BASIC PAY FOR AIRMEN

Royal Air Force

Rank		
	s. d.	
Junior Technician	98 0	
Corporal Technician	122 6	
Senior Technician	150 6	
Chief Technician	171 6	
Master Technician	199 6	
	Higher scale	Lower scale
	s. d.	s. d.
Corporal	112 0	105 0
Sergeant including aircrew	147 0	136 6
Flight Sergeant including aircrew	171 6	154 0
Warrant Officer and Master Aircrew	199 6	185 6

Notes: (i) The higher scale is applicable to "advanced" trades, pilots, navigators, air signallers (A), air engineers (A), air gunners (A) and air meteorological observers.

(ii) The lower scale is applicable to "skilled" trades, air signallers, air engineers and air gunners.

(iii) The increments for service and service in the rank shown in paragraph 3 of Section D above are payable in addition.

THE RETIRED PAY AND PENSIONS OF FORMER FORCES' OFFICERS AND CIVIL SERVANTS AFFECTED BY STABILISATION AND CONSOLIDATION IN 1932–1935

(Cmd. 9092)

INTRODUCTION

1. Much discussion has taken place in recent months in regard to the suggestion that the retired pay of Officers of the three Fighting Services who retired under the 1919 Code should be increased beyond the levels allowed by successive Pensions Increase measures. In particular there has been a demand for a restoration to all such Officers of what is commonly known as "the 9½ per cent. cut." Much of the discussion which has taken place has shown widespread misunderstanding about many of the facts as well as the policy behind this situation. The Government therefore think it right that they should set out in some detail the history and underlying reasons for the "9½ per cent. cut," and should also set out their policy, with the considerations which lead to it, on the general question of the improvement of the pensions of Crown pensioners to compensate for rises in the cost of living occurring after retirement. The main purpose of this Paper is to do this.

2. It is not possible fully to do so without some explanation of the 1935 consolidation, from which the "9½ per cent. cut" stems, and the events leading to it. This in turn calls for a short description of the general principles of the systems both of Officers' retired pay and of Civil Service pensions which were then in force.

THE SYSTEMS

Officers' Retired Pay

3. In the three Services the rules and regulations by which an Officer qualifies for retired pay are known as the retired pay code. This code, which is distinct from the pay code, may be changed from time to time, and since the 1914–18 war there have been four distinct phases: soon after that war the then existing arrangements were replaced by the 1919 code, with which this Paper is mainly concerned; this in turn was revised in 1938; there was a substantial revision in 1945; and another revision in 1950.

4. When the code is changed, and normally when the rates of pension awarded within the framework of the code are changed (which may happen independently of a change of code), the changes are not applied to Officers who have already retired.

5. *The* 1919 *Code*.—This code provided for retired pay to be calculated on rank or age and length of service, with maximum rates for each rank. It also provided, and in this it was unique among retired pay codes, that the high rates then introduced should be regarded as attributable to the then high cost of living and that they should therefore be subject to revision, either upwards or downwards, on account of variation in the cost of living, to an extent not exceeding 20 per cent. It provided that the first review of

rates would take place in 1924 and that subsequent revisions might be made at three-yearly intervals. The revisions were to apply to retired pay already in issue under the code as well as that of Officers retiring after the revision.

6. A copy of that part of the Instruments which referred to the variation of rates with the cost of living is attached as Appendix I.

7. The Instruments did not lay down in detail how the variations should be effected. A formula had therefore to be sought for this purpose. The effect of the formula devised is set out in Appendix II. The practical result was that, for all ranks of Officer equally, the top 20 per cent. of the 1919 rate of pension was—to quote the Air Ministry order—"detachable and liable to variation." It will be seen that the cost-of-living index had to fall right back to the 1914 level to reduce the pension by the full 20 per cent. And in fact such a reduction would still have left the pension significantly above the 1914 rate.

Civil Service Pensions

8. Civil Service superannuation benefits have (at all times material to this question) been calculated by reference to length of service and to pay. Up to 1909, Civil Service pensions were calculated at 1/60th of retiring pay for each year of service with a maximum of 40/60ths. Since 1909 Civil Service superannuation benefits have been in two parts: a pension of 1/80th of salary for each year of service subject normally to a maximum of 40/80ths and a lump sum; up to 1940 the lump sum was 1/30th of salary for each year of service subject to a maximum of 45/30ths; in 1940 it became 3/80ths for each year of service subject normally to a maximum of 120/80ths. Up to 1940, pensions and lump sum were normally calculated on pay at the date of retirement; but since 1940 the calculation has been related to the average pay for the three years immediately before retirement.

9. No pension is paid for less than 10 years' service, nor (subject to minor exceptions) until the minimum retiring age of 60 is reached.

10. Thus whereas Forces Officers' retired pay is awarded under a set of rules which are separate and distinct from those regulating their pay, Civil Service pensions are calculated by direct reference to salary in the period before retirement. The result is that variations in Civil Service pensions have occurred as a direct consequence of variations in pay. It is therefore necessary to describe the Civil Service pay system at the relevant time.

11. *The Civil Service Bonus System.*—In the period following the 1914–1918 War, Civil Service pay was subject to a complex bonus system designed to adjust pay according to changes in the cost of living. During and immediately after the war a series of *ad hoc* awards of cost-of-living bonus were made. But in 1920, when the cost-of-living figure as measured by the retail price index was 130 per cent. above 1914, a more systematic scheme was introduced. This provided for bonus to be revised periodically on the basis of the cost-of-living figures for the previous period, and to be added to basic salaries (i.e., in principle 1914 salaries) as follows:

(*a*) on salaries up to £91 5*s*. a year, and on the first £91 5*s*. a year of larger salaries—an increase directly proportionate to the increase borne by the current cost-of-living figure over the 1914 figure (e.g., the first £50 of salary was increased to £102 10*s*. by a bonus of £52 10*s*. when the cost-of-living index was 105 above 1914);

(*b*) on the element of salary between £91 5*s*. and £200 a year—60/130ths of the increase directly proportionate to that of the current cost-of-living figure as compared with that of 1914;

(*c*) on the element of salary from £200 to £1,000 a year—45/130ths of the increase directly proportionate to that of the current cost-of-living figure as compared with that of 1914.

12. It was laid down that the bonus arrangement applicable in (*c*) above of 45/130ths should apply equally to the element of salary above £1,000 a year subject, however, to an overriding maximum of £750 a year of bonus. In the case of certain posts (in effect, Permanent Secretaries and Deputy Secretaries of major Departments, whose basic salaries had recently been revised) the overriding maximum was limited to £500 a year.

13. This system, more particularly as applied to the higher grades of the Civil Service, encountered a great deal of adverse criticism in subsequent months. This was the period of the Geddes Committee's Report, a period when great reductions in Government expenditure were being sought, after the "honeymoon" period immediately following the end of the war. In the result, the Government announced on 26th July, 1921, the introduction of a "supercut" which was brought into effect by a Treasury Circular issued on 23rd August, 1921. By this supercut the scale of bonus on salaries between £500 and £2,000 was reduced progressively as salaries rose and above £2,000 a year it was abolished altogether.

14. The supercut was the subject of repeated protests on behalf of the staff concerned during subsequent years. But it remained in force up to and including the final consolidation of the cost-of-living bonus, in 1935.

15. These events inevitably affected Civil Service pensions, which, it has been explained, are directly related to pay.

16. At first, in contradistinction to the 1919 code for retired Forces' Officers, there was no provision for the modification of pension, *once awarded*, in accordance with changes in the cost of living, though it was provided that only 75 per cent. of the bonus should count as pay in the calculation of pension.

17. The fixity of pension once awarded based on high rates of bonus was, however, strongly criticised in Parliament in 1922 when the cost of living was falling rapidly and in February, 1922 the then Financial Secretary to the Treasury undertook to provide for future pensions to be subject to periodic reassessment in relation to the cost of living as was the retired pay of Forces' Officers. The new system was brought into effect immediately.

18. From 21st February, 1922, onwards, pension awards were made in two parts, computed on the basic salary (i.e., the salary at 1914 levels) and the bonus respectively. The portion of pension which depended on bonus was thereafter computed on the full 100 per cent. of the bonus and not, as hitherto, on 75 per cent., but was to be adjusted quarterly on the basis of any reduction in the cost-of-living figure for the preceding quarter.

19. Such were the essential points of the systems then in force for dealing with Officers' retired pay and Civil Service pensions. They differed in detail, necessarily, because the two codes were designed to meet different circumstances. But they had this in common, namely, that under each a proportion of the pension was subject to variation in accordance with the cost of living.

WORKING OF THE SYSTEMS UP TO 1935

20. The 1919 rates of Officers' retired pay were fixed when the cost-of-living index stood at 107·5 per cent. above 1914. By July, 1924, when the first review was made, the index had fallen to 69·4 per cent. above 1914. Under the formula set out in Appendix II a reduction of about 7 per cent. in rates of retired pay would have been appropriate. The reduction actually made, however, was one of 5½ per cent. only. By 1927 when the next review was due the cost-of-living figure was 63 per cent. and the rate of reduction was increased to 6 per cent. In 1930 when the formula would if fully applied have produced a cut of 8 per cent., that actually made was one of 7 per cent. In July, 1931, there was a special review, the cost of living having fallen to 45 per cent. above 1914: a deduction of 11½ per cent. could have been made, but that actually made was one of 8 per cent.

21. Meanwhile, under the parallel system in the Civil Service, bonus was being reduced every six months or so, and pensions awarded from 21st February, 1922, adjusted accordingly. By the summer of 1928 bonus was calculated on the basis of a cost-of-living figure which had fallen to 70 per cent. above 1914. It had been adjusted no less than sixteen times.

22. These repeated adjustments, nearly all downwards, were very much disliked, and there was strong pressure for a modification of the system. In the event the Government decided on two occasions to mitigate its incidence: in September, 1929, the bonus was maintained at a level appropriate to a cost-of-living figure of 70 instead of to the 65 actually ruling at the time; and the reduction for September, 1930, to February, 1931, was similarly mitigated by adopting a basis of 65 instead of 60.

23. Then in the autumn of 1931 came the financial crisis. This resulted in a strict application of the sliding scale formula both for retired Officers and for Civil Servants: Civil Service bonus was reduced to relate to the actual cost-of-living figure; and the rate of reduction for Officers' retired pay was increased from 8 per cent. to 11 per cent.; further, a Royal Warrant of 1931 shortened the periods between revision.

24. Meanwhile the Royal Commission on the Civil Service had reported, and in their Report (Cmd. 3909) had recommended against further continuance of the system of relating Civil Service pay to a cost-of-living index. They observed that "in the period immediately after the war some method such as that embodied in the cost-of-living agreement was no doubt opportune. It was never intended that the scheme embodied in that agreement should be continued indefinitely and we regard its further continuance as open to objection."

25. This set in train the movement which led eventually to the abolition of the cost-of-living bonus in the Civil Service and to the comparable consolidation of the pay and retired pay of Forces' Officers.

STABILISATION

26. It was in 1932 that the Government of the day took the decision to abandon the system under which the pay of Forces' Officers and Civil Servants, and the pensions of those retiring under the 1919 and 1922 arrangements, respectively, varied with the cost of living. They accepted the recommendation of the Royal Commission in respect of Civil Servants

and a similar recommendation made by the May Committee (Cmd. 3920) in respect of Forces' Officers. They decided thus because they considered that experience since the 1914–1918 war fully demonstrated the fundamental unsoundness of a system under which the remuneration of Crown Servants alone varied directly with the cost of living as measured by the index of retail prices.

27. The decision was a decision of principle, and in this connexion it should be noted that the May Committee expressly emphasised that they regarded the reductions they proposed (on pay and pensions), not as sacrifices necessitated by national financial stringency, but as readjustments necessary to establish fair relativities over the field of Government and local authority servants and wage earners generally.

28. Final consolidation of pay and pensions did not, however, follow at once on the Government's decision. In the face of the uncertain economic outlook it was thought unwise to adopt forthwith a course which might well prove expensive. What actually happened next emerges clearly from the following extract from Army Council Instructions accompanying a Royal Warrant of 1932 which declared that rates of Forces' retired pay should not again be revised until 31st March, 1934:—

> "His Majesty's Government have had the whole question of the remuneration of the services of the Crown under review and have decided that emoluments should now cease to vary automatically with changes in the index figure, but shall be consolidated. They have further decided that, subject always to the overriding consideration of the national financial position, final consolidation shall be deferred until 1st April, 1934, and that in the meantime the rates shall be stabilised at the current reduction from standard rates, viz., 11 per cent., which corresponds to a cost of living figure of about 49, subject to the proviso in the following paragraph.
>
> "If during the above period of stabilisation the index figure remains below 35 or above 60 for six consecutive months, the resultant situation will be reviewed in the light of all relevant considerations including the cost of living."

29. Consolidation was not, however, effected in April, 1934. The rates of retired pay then in issue were, however, improved from 1st July, 1934, the cut of 11 per cent. being reduced to 10 per cent. The cost of living had not been rising, and this increase was regarded as a partial restoration of economies made in 1931, when, for the first time, the sliding scale had been fully applied. In August, 1934, a Warrant announced that consolidation would be at 9½ per cent. below the 1919 rate; but as this meant an increase in rates, it was deferred "until the state of the national finances permit."

30. Final consolidation took place on 1st July, 1935, at a level 9½ per cent. below the 1919 rate. This level was related, under the formula previously in use, to a cost-of-living figure 55 per cent. above 1914. In fact, however, the latest available cost-of-living figure stood at only 40 per cent. above 1914, which on the same basis would have justified a rate 12½ per cent. below the 1919 rate.

31. Meanwhile, over the same period, parallel decisions were applied to Civil Servants, consolidation for them also being based on a cost-of-living figure of 55 and not on the current figure of 40.

32. It is sometimes said that the Government operated the cost-of-living system only for so long as the cost of living was going down, and brought the system to an end as soon as it could be seen that it was going to rise. As has already been explained, the decision to stabilise and consolidate rates was first announced in 1932, when the cost-of-living index was still falling. The cost of living did not exceed the figure of 55, on which the stabilisation was ultimately based, until 1938. The mean cost-of-living figures for the years from 1931 till 1939 were as follows:

1931	47½
1932	44
1933	40
1934	41
1935	43
1936	47
1937	54
1938	56
1939	58

33. The measures just described brought to an end the exceptional period during which Officers' retired pay and Civil Servants' pensions were varied with the cost-of-living index. They constituted a return to the previous policy—which had all along been applied continuously to those who retired before 1919—under which a pension, once awarded, normally remains unaltered.

34. It is hardly possible at this date to be dogmatic about the reactions of those concerned at the time to these measures. But there is little doubt that the system as it had operated for some ten years or so was not popular, either in the Civil Service or in the Fighting Services; that interim stabilisation in 1932, i.e., the virtual suspension of the system, was welcomed; and that consolidation, i.e., the abandonment of the system, was not opposed. So far as the Civil Service was concerned, though the Staff Side of the National Whitley Council may have wished for consolidation at a higher level, they had no quarrel with consolidation itself; they had proposed it in their evidence to the Royal Commission. So far as the Forces were concerned, proceedings in Parliament bear no evidence of complaints either at the time or during the years immediately following. Nor is there any other evidence of a general body of complaint at that time.

The General Question of Pensions in a Period of Falling Money Values

35. Both the First and Second World Wars were followed by periods of rising prices and falling money values. Such a situation involves difficulties for public service pensioners and it is necessary to consider the action approved by Parliament after both World Wars to meet the situation.

36. After the First World War the Governments of the day, faced with demands for improvements in the pensions of those who had retired before post-war codes came into force, had responded with the Pensions Increase measures of 1920 and 1924. The essential principle underlying those measures—which covered public service pensioners generally (teachers, local authority staffs, &c.) and not only retired Officers of the Services and Civil Servants—was that whereas normally the pensions of former public servants are not adjusted to meet changes in circumstances after retirement, in exceptional circumstances of severe deterioration in the value of

money it is justifiable to give some help to those pensioners in serious need of help—that is to those living on small incomes. To go further, it was held, would not only be wrong in principle having regard to the fundamental basis of occupational retirement pensions, but would be manifestly unfair to those others in the community similarly living on small fixed incomes and perhaps, as tax-payers, bearing part of the cost of any additional help given to public service pensioners. Thus the State ought not at public cost to protect its own servants against a decline in the value of money (including their semi-contractual pensions) which had affected many others besides them. In conformity with this principle the 1920 and 1924 measures gave no increases to those with incomes of more than £200 a year (married) and £150 (single). Thus, while all the Forces' Officers who retired under the 1919 code had rates of pension designed to reflect the higher cost of living, their colleagues who had retired earlier and had incomes of more than £200 a year got no help at all. The effects on Civil Service pensioners were similar.

37. Faced with a like situation in and after the 1939–45 war, all later Governments, the Coalition Government in 1944, the Labour Government in 1947 and the present Government in 1952, have thought it right to follow the same policy: not to give assistance to all public service pensioners irrespective of serious hardship, but to give it where it was most needed to relieve real hardship—as distinct from the relative hardships which a fall in the value of money admittedly inflicts on all who live on fixed incomes, even substantial ones.

38. Thus the 1944, 1947 and 1952 measures were in general designed to assist pensioners with dependants whose means were not more than £300, £450, and £550* respectively. These rising limits for determining whether pensioners were eligible for assistance under the schemes took account of the fall in the value of money between the successive measures.

39. In the 1944 measures the Government of the day recognised, however, the peculiar position of retired Officer and Civil Service pensioners in that they had, up to seven years before the outbreak of war, been under a system which permitted pension adjustment in accord with the changes in the cost of living. As a result Section 2 of the Pensions (Increase) Act of 1944 provides (as do the corresponding arrangements for Forces' Officers) for increases of 10 per cent. on Civil Service pensions up to £400 a year, with smaller increases on pensions up to £645, irrespective of any other income. This is usually known as the "automatic" scheme. In the Act and corresponding arrangements of 1947, the pension limit for this special assistance was raised to £787 10*s*. It will be seen that even in this recognition of a special situation, deemed to warrant the singling out of retired Officers and Civil Servants for special treatment not accorded to other public service pensioners, it was thought right to limit the assistance to the lower and middle pension ranges and to exclude those with high pensions. And when in 1952 Her Majesty's Government submitted to Parliament the Pensions (Increase) Bill they felt that the funds available should be concentrated on relief of the greater hardship experienced by those with small

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* Taking account of "disregards," incomes of £352, £502, £654, respectively. (Under the 1944, 1947, and 1952 schemes the first £52, £52, and £104, respectively, of means other than pension were disregarded in assessing total means for purposes of determining eligibility.)

pensions and little or no other means. The 1944–47 schemes had virtually restored 1919 rates for all but those on the highest pensions, and the 1952 schemes therefore included no proposals for any extension of that scheme. In passing the Act, Parliament endorsed this policy.

40. The practical effect of all these changes over the years is seen in the following table, which shows how typical pensions payable to retired Officers and Civil Servants in 1919 and 1922 (the years in which, respectively, the sliding scale system was introduced) (*a*) compared with those payable (excluding any increases under the Pensions Increase arrangements of 1920 and 1924) to those who retired in 1914, and (*b*) varied in the years which have followed.

OFFICERS

(1)	Maximum rates for those who retired in 1914 (2)	Maximum rates 1919(*) (3)	Changes in pensions in column (3) in subsequent years				
			July 1935	Position after 1944–47 Pensions Increase measures (man with dependant)		Position after 1952 Pensions Increase measures (man with dependant)	
				Min.	*Max.*	*Min.*	*Max.*
	£	£	£	£	£	£	£
Captain ..	200	300	272	299	332	299	358
Major.. ..	300	450	407	440	450	440	476
Lieut.-Colonel	420–450	600	543	584	584	584	584
Major-General	700	1,000	905	905	905	905	905

(*) Cost of living 107½.

CIVIL SERVANTS†

(1)	Maximum rates for those who retired in 1914 (2)	Maximum rates 1919* (3)	Changes in pensions in column (3) in subsequent years				
			July 1935	Position after 1944–47 Pensions Increase measures (man with dependant)		Position after 1952 Pensions Increase measures (man with dependant)	
	1914	1922‡		*Min.*	*Max.*	*Min.*	*Max.*
	£	£	£	£	£	£	£
	200	311	258	284	318	284	344
	300	432‖	369	406	429	406	455
	450	601‖	529	569	569	569	569
	700	846‖	777	788	788	788	788

* Cost of living 107½.

† The Civil Service pensions shown in column (2) are those payable under the Superannuation Act of 1909, for 40 years' service on retiring salaries of £400, £600, £900, and £1,400 respectively; those in column (3) are the corresponding pensions on the same salaries as those in column (2) (basic salaries having remained unchanged) *plus* bonus.

‡ Cost of living 105.

‖ Had the supercut not been made (see §§13 and 14 above) these pensions would have been £447, £652, and £995 respectively.

CONCLUSION

41. It is clear from this survey that during the period in question retired Forces' Officers have been treated in principle in the same way as retired Civil Servants have been treated. During the post-war period until 1931 both Officers and Civil Servants received pensions which not only were awarded at varying levels as the cost of living moved, but were also varied after award in sympathy with the cost of living. For Officers this system started in 1919; and it was fully applied to Civil Servants in 1922. In both cases this system represented a deviation from the normal principle that public service pensions once awarded are not altered, and was an exceptional arrangement expressly designed to meet the abnormal circumstances of the period immediately following the end of the First World War. These exceptional arrangements met with severe criticism both in principle from dispassionate observers and in practice from many of those personally concerned. The abandonment of the system for Civil Servants was recommended by a Royal Commission; and when this recommendation was accepted and acted upon by the Government of the day it was generally agreed to be right that the decision should also be applied to Forces' Officers.

42. The very close parallel between the histories of Forces' Officers and civilians in this matter leaves no doubt in the mind of Her Majesty's Government that if there were to be any further changes in the position of those members of the Crown services who retired between 1919 (or 1922) and 1945 it would be inequitable not to treat all four Services alike.

43. The decision to stabilise cannot, however, in the case of either Forces' Officers or Civil Servants, fairly be regarded as a breach of faith and, therefore, one to be reversed on that account. Indeed, the prerogative instruments of 1919 expressly stressed the exceptional nature of the 1919 arrangements for Forces' Officers: from their beginning they had in them provision for modification and cannot, therefore, be regarded as immutable.

44. The fundamental principle of public service pensions, that once awarded they are not normally subject to change in either direction, has been upheld by successive Governments. It has also been endorsed by Parliament. Her Majesty's Government are in no way prepared to abandon it. In their view it is a principle that should be departed from (as it has been) only to the extent that severe falls in money values causing real hardship among pensioners may justify special increases—as distinct from revised pensions—where the degree of hardship calls for it. Thus as recently as 1952 the last Pensions (Increase) Act was passed for public service pensioners and similar provision made for retired Officers. There has since been no change in the circumstances to justify further exceptional action of this sort.

45. Thus in the Government's view there can on the one hand be no return to the exceptional arrangements prevailing in the 20's and 30's for retired Forces' Officers and Civil Servants; nor on the other is there any sufficient case for further general improvements in pensions for public service pensioners.

46. But, having said this, Her Majesty's Government recognise that the operation of the sliding scale between the wars has, in fact, given rise to a special grievance which is acutely felt by retired Forces' Officers. And

indeed, though the earlier parts of this paper which set out the history demonstrate that the decisions of previous Governments were taken in good faith and were at the time entirely reasonable, a sentiment on the part of the pensioners that as things have turned out they have been unfairly treated is understandable. The fact is that at one time pensions and retired pay fell as the cost of living did, but have remained fixed while it has risen, and risen fairly considerably.

47. It can be argued that this creates a special situation for these two groups of pensioner. Not only can it be so argued but Her Majesty's Government are aware that many people have been and are so arguing, and are reproachful of the Government for failing to accept the view that the circumstances are unique and thus justify special action quite outside what may or may not be justified under the normal principles of pensions policy applicable elsewhere. The Government have taken note of these views.

48. They are also conscious that in the Pensions Increase measures of 1944 and 1947 the Governments of the day recognised the special position of these two groups of pensioner by making special provision for what was, in effect, a restoration of the "1919" rates for those in the lower pension bands, and a partial restoration in the middle pension bands. In effect those Governments said: there can be no question of returning to the abnormal system of varying these pensions according to changes in the cost of living; the decisions of the early 30's were right and must stand; but there is a case for restoring, at any rate in the case of the lower pensions, the rates which had at one time been actually in force. They did not, however, think it justifiable to restore these rates for all. The result was the somewhat illogical compromise enacted in Section 2 of the Pensions (Increase) Act of 1944 as modified by the Act of 1947, and corresponding Instruments.

49. Having now reviewed the matter in the light of all the circumstances, past and present, Her Majesty's Government have decided that it would now be right to revise the 1944 and 1947 arrangements to bring within their scope all the retired Forces' Officers and Civil Service pensioners concerned and to allow to all of them the minimum increase of 10 per cent. already enjoyed by those with pension or retired pay of up to £400 a year. The Government will submit Warrants to Her Majesty to bring this about for retired Forces' Officers, and in the case of the Civil Servants will propose the necessary legislation to Parliament.

50. For Forces' Officers this will have the broad effect of restoring the "9½ per cent. cut" for all those who were affected by it. Thus will be removed what for many years has seemed to many people to be a real injustice.

APPENDIX I

EXTRACTS FROM THE ORDERS OF THE THREE SERVICES PROMULGATING THE NEW RATES OF RETIRED PAY, VARIABLE WITH COST OF LIVING, INTRODUCED IN 1919

ROYAL NAVY

Extract from Admiralty Order in Council of the 22nd January, 1920,
Schedule V, *Section X*, *Paragraph* 9

"The rates of full pay, unemployeed pay, half pay, retired pay, allowances and gratuities, authorised under these regulations to be subject to review on or after 1st July, 1924."

ARMY

Extract from Army Order 324 *of* 1919, *General Conditions*, *Paragraph* 1

"The new rates . . . . are granted in consideration of the present high cost of living and the rates of pay, half pay and retired pay will be subject after 5 years to revision either upwards or downwards to an extent not exceeding 20 per cent., as the cost of living rises or falls. After the 1st July, 1924, a further revision may take place every three years."

ROYAL AIR FORCE

Extracts from Air Ministry Order 1003 *of* 1919

Paragraph 7

"The new rates of pay and pensions have been drawn up in the light of the present high cost of living and it has therefore been decided that 20 per cent. of the rates should be regarded as detachable and liable to alteration either upwards or downwards according as the cost of living rises or falls. No revisions of this kind will be made for five years, thereafter revisions will be made every three years. These revisions will apply to all pensions which are being drawn on the new scales at the date of revision as well as to future awards. They will not apply to gratuities or the lower rates of half pay."

Paragraph 9 *C*

"No officer shall be entitled to claim hereafter any pay, pension or other advantage conferred by any provision in this scheme in the event of any such provision being at any time added to, varied or cancelled. It must be clearly understood that while every consideration will be given to the reasonable and legitimate interests of individuals, it will be competent for the Air Council at any time to modify the administrative regulations under which the emoluments of the Royal Air Force are drawn. In particular no claim can be founded on a regulation the operation of which is merely contingent, *e.g.*, a regulation prescribing a rate of pay which is revised before the claimant attains the rank for which it is prescribed."

APPENDIX II

This table illustrates the effect of the formula devised under the 1919 Code for varying the retired pay of Forces' Officers with changes in the cost of living. Column A shows the per cent. abatement to which retired pay was subject when the cost of living stood at the corresponding levels quoted in Column B.

A	*B*	*A*	*B*
Per Cent. Abatement	*Cost-of-Living Figure* (above 1914)	*Per Cent. Abatement*	*Cost-of-Living Figure* (above 1914)
20	0	9	59·125
19	5·375	8	64·500
18	10·750	7	69·875
17	16·125	6	75·250
16	21·500	5	80·625
15	26·875	4	86·000
14	32·250	3	91·375
13	37·625	2	96·750
12	43·000	1	102·125
11	48·375	0	107·500
10	53·750		

THE NORTH ATLANTIC TREATY ORGANISATION

[*The following exposition of the European Defence organisation, set up under the North Atlantic Treaty, and review of its development up to date, was given by General Alfred M. Gruenther, Supreme Commander, Allied Command Europe, in a public speech in New York City on October* 8, 1953. *It is here reproduced by his permission.*]

I AM DELIGHTED to have the opportunity to talk to you this evening about the North Atlantic Treaty Organisation, commonly known as N.A.T.O. It has a membership of 400 million people from fourteen nations.

The organisation is unique in the history of the world. Nothing like it has ever been attempted before. It would be easy for a cynic to prove that it could not succeed. But N.A.T.O. to-day is a thriving success. The degree to which it will continue to thrive is of tremendous importance to you and to the entire Free World. Its ability to preserve peace in this troubled world may well determine the future of our civilisation.

As Supreme Allied Commander, Europe, I am charged by N.A.T.O. with the defence of Europe, extending from the northern tip of Norway to the eastern borders of Turkey, an arc of some 4,000 miles. I am charged with defending it tonight, tomorrow or next year. I am charged with defending *all* of Western Europe, not merely the easy portions. Our headquarters is located ten miles from Paris. It is called SHAPE. The initials stand for Supreme Headquarters, Allied Powers, Europe.

To provide for more effective control in an emergency, the vast SHAPE area has been divided into regional commands. The Northern Command under General Mansergh, a British General, charged with the defence of Norway and Denmark; the Central Command under Marshal Juin of France at Fontainebleau, 30 miles south of Paris; the Southern Command, Italy, Turkey and Greece, under Admiral Fechteler at Naples and the Mediterranean Command under Admiral Mountbatten, a British Admiral with headquarters at Malta.

It is encouraging to be able to report to you that our defence forces are now from two to three times as effective as they were when General Eisenhower came to Europe in January, 1951. This applies particularly to our air forces which initially were pitifully weak, and even today cause us our greatest concern.

During this same period the defence budgets of the member countries have increased significantly. Not considering the United States, the other N.A.T.O. countries have more than doubled their defence budgets. If the United States increase is taken into account, the ratio is still more favourable.

Nearly all countries have increased their periods of national service in their armed forces, the most recent case being that of Denmark which has now provided for 18 months service.

Our concept for the defence of Europe is based on the maintenance of highly trained covering land forces, backed by reserve units which would be brought into action immediately after the outbreak of hostilities. That shield, supported by hard-hitting air forces, should give us the necessary cushion of time to permit us to mobilise our reserves. Meanwhile, allied long range air forces would conduct powerful retaliatory attacks deep into enemy territory against industrial and other vital targets.

During this period of almost three years we have had the opportunity to prepare defence plans for the employment of our forces to meet an act of aggression. Every commander now knows what the mission of the forces under him would be in the event of an emergency. That does not guarantee that we would be able to withstand an attack successfully, but at least each element of the command knows what action to take. The success of our efforts would depend on the amount of force that the aggressor would bring against us, and also on the skill with which he would employ that force.

Just what could our N.A.T.O. forces accomplish now? One official, with a cynical turn of mind, when asked three years ago, "What do the Soviets need to march to the English Channel?" answered, "Only shoes!" I can assure you that today, October 8, 1953, the N.A.T.O. forces of Allied Command Europe are of such a strength that the Soviets today probably do not have sufficient power in Occupied Europe to launch an attack with any reasonable certainty of success. In other words, we consider that the Soviets would have to bring in additional reinforcements from the U.S.S.R. itself both in air power and in land forces before an attack against the West would be successful. If that estimate is correct it represents a most significant achievement, because for one thing it means that we should be able to obtain a reasonable amount of warning of an impending attack.

We should then be able to take appropriate precautionary measures especially in readying our air forces, and we should be able to mobilise our land reserves to give us a better chance to meet the threat.

This is a much greater capability than we thought would be possible when SHAPE was organised.

Before leaving this question of progress I should like to make it crystal clear that *we still do not have adequate strength to defeat an all-out Russian attack*. That is why we have recommended to the North Atlantic Council that our forces should continue to be strengthened.

One of the sources of additional defensive strength is Western Germany. As you know, six of the continental nations are now considering a plan for a European Defence Community which provides, among other features, for German military participation in the defence of Europe. We have analysed the military aspects of this plan. We consider it not only feasible but also highly desirable from a military point of view. The outlook for EDC is better now than it has been at any time. The chances that the treaty will be ratified within the next few months are reasonably good.

What are some of the major problems which we still face?

We consider that air power is the dominant factor in modern warfare. Our most critical deficiency today is the strength of our air forces, and I say that in spite of the excellent progress already made. For example, in three years the number of N.A.T.O. airfields has increased from 20 to 120—a truly remarkable achievement. The Soviets have an air force of some 20,000 operational planes, a large proportion of which are jets. To meet that air threat our air forces must be increased and their effectiveness must be such as to be ready to fight on an instant's notice. We at SHAPE have given first priority to the development of our air forces. That does not mean that we think we could win a war solely by the use of air power. We consider that an adequate defence posture in Europe can be obtained only by the air land-naval team.

Earlier I told you that under our concept our shield would hold long enough to enable our reserve forces to mobilise and move to the area where they are needed. Unfortunately those reserves are still critically inadequate. That deficiency represents our second major problem. The Soviets have a very large active land force in being, consisting of 175 Soviet divisions plus approximately 70 satellite divisions. The satellite divisions are only moderately effective, but they are improving constantly. We have no thought of trying to match that total force division for division, because maintaining active forces of that magnitude would place unacceptable strain on our economy. That is the reason why we place such great dependence on reserve divisions. But those divisions must be good, because if they are to be employed against well trained Soviet forces—and Soviet divisions are well trained—their effectiveness has to be of the highest calibre. The creation of adequate reserve forces presents a difficult problem for the N.A.T.O. governments. It means that a sizeable proportion of our military-age manpower will have to spend a part of each year in reserve training. That is inconvenient for the individuals concerned, and, of course, it tends to create economic strains when these men are withdrawn temporarily from civilian pursuits.

But in spite of these deficiencies I think it is fair to say that we have done exceptionally well in the initial build-up phase of our N.A.T.O. defence effort. What is the nature of the problem we face in the future? What is the outlook for success?

In simple terms I should say that we are now confronted with the problem of the long pull, because every indication points to a prolonged period of strain. A friend of mine used to say, "The pocketbook is the most sensitive nerve of the human body," and I suppose that is a wise observation. Certainly it is true that the economic difficulties of the N.A.T.O. nations are very serious for them. It is also true that important social and economic projects have been deferred by them as a result of heavy expenditures for defence. Our armed forces will be effective only to the extent that the nations supporting them remain strong in spirit, active in intellectual endeavour, and sound economically. The task, therefore, for the N.A.T.O. countries now is to establish on a long term basis that balance between military, economic, and social factors which will make us reasonably secure both from external attack by an aggressor and from internal disintegration resulting from poverty and discouragement.

A defence programme is something that cannot be turned off every time Soviet leaders speak of the possibility of co-existence and turned on a month later when a Laos is invaded or an Iran manœuvred to the edge of the land of no return. We cannot afford it psychologically and we cannot afford it financially.

I think that it requires no great vision to be able to predict that N.A.T.O.'s next three years will be more difficult than its first three year period.

It is well to recognise that N.A.T.O. was created in an atmosphere of fear. The threat was towering and immediate, the hour was late. The whips of fear drove us into each other's arms. Ancient rivalries were forgotten. Political differences were reconciled. Confronted by the facts and by the question of survival, we found that survival was paramount and all else secondary. That element of fear is beginning to disappear. One reason is the very success we have had to date in building up a certain degree of strength in N.A.T.O. We have grown stronger, and many hope—rather wishfully, I fear—that Soviet intentions are changing. I think it would be a tragic mistake for us to lower our guard now.

As for the military potential of the Soviet bloc, there is no evidence to indicate that it is lessening. On the contrary, all of the intelligence available to us indicates that it is increasing.

As for Soviet intentions, most authorities who study that subject continuously, have come to the conclusion that the overall objective of Soviet imperialism remains steadfastly the same. It is only the manner by which it seeks to achieve these objectives which may be undergoing revision. Within the past ten years the number of people in the Soviet orbit has increased from some 190 million to over 800 million. It now constitutes the largest empire in the history of mankind.

Soviet leaders have made it unmistakably clear that one of the prime objectives of Soviet foreign policy is the dismemberment of the N.A.T.O. alliance, and the progressive isolation of its member states. This, of course, is the ancient but still valid strategy of divide and conquer.

It is a sad commentary on the state of the world today that peace cannot be established without military power. Nevertheless that is a fact. We have tried negotiation from weakness and in the process we have seen almost half of the world swallowed up in the darkness of Soviet imperialism. We must have military strength not only to resist aggression, but to give our political leaders a firm basis from which to negotiate a modus vivendi with the Soviet Union.

During recent months Soviet propaganda efforts have emphasised what they term "the aggressive nature of N.A.T.O.". I can assure you that there has never been as much as a single paragraph written at SHAPE which envisages that we would be the aggressor. All of our plans are based upon the assumption that war, if it comes, will be started by an enemy. Thus, we have to plan our strategy accordingly. I need not tell you that in this day of modern weapons that this is a tremendous disadvantage for us. But it is a disadvantage which we must accept. We could never maintain our moral position in the free world if we should ever allow ourselves to contemplate the launching of a so-called preventive war. The Soviets know well that our troop dispositions and our strengths are such that we do not have a capability to assume the rôle of an aggressor even if we wished to do so. If they do not understand that our alliance is clearly a defensive one, and that our objective is the preservation of peace, it could be only a distorted philosophy which blinds them.

I have noted within the last few weeks, since the announcement concerning the Soviet experiment with respect to the hydrogen bomb, that some serious-minded people in the United States have been posing a question which runs very much like this:

> Should we not concentrate our efforts on meeting the Soviet atomic threat instead of building a defence of Western Europe?

It seems to me that there is a basic fallacy in the way this question is posed. No responsible person would question the need for rapid and energetic action to meet the growing Russian atomic threat, and I would be the last to quarrel with this part of the proposal. What is wrong, it seems to me, is to view actions of this kind as an *alternative* to building a defence of Western Europe. If the question were put in the form:

> Shouldn't we concentrate on the defence against a Soviet atomic threat *in addition to* building a defence of Western Europe?

I think we would see the nature of the problem more thoroughly.

A few go further, however, than pointing out the growing need to meet the atomic threat. They question whether in an age of atomic warfare the defence of the Western European area really retains much importance. They argue that it is unlikely that an atomic war could be won by operations in Europe west of the Iron Curtain. But that is only part of the story. The question must also be asked: "Could the war be lost through reverses there?" And, more important, "Could the peace be lost there?" The buildup of military strength under N.A.T.O. command in Western Europe is dedicated to the dual proposition: First, that without such strength we would be in great danger—too great to accept—of losing a war if it should occur. Secondly, that without such strength we would once more find ourselves in a situation where the danger that war might occur would be extremely grave.

We have already taken effective action to block the Western European avenue to an easy and cheap conquest. We must now keep it blocked. The buildup of strength that has already occurred has denied to a potential aggressor the possibility of obtaining, as some wise man put it, the fruits of war without the cost of war.

Others have argued that the atomic development offers an opportunity to escape from the close contacts and concessions to solidarity that collective security requires. They feel that because the complications which arise in military coalitions are so great, because the burdens seem to be never-ending, and because there seem to be so many cases of interference between the members, we would do better to shift to defence against a different form of threat. But this view simply blinks the fact that the original threat remains. It has not diminished and, in fact, has increased in many aspects. New weapons frequently have the effect of adding new problems and new tasks without eliminating those that previously confronted us. It would be tragic in the extreme, if, through concern over a new threat, we dropped our defences against an old one which still remains.

I think it is fairly simple to write a prescription for success of the North Atlantic Treaty Organisation. It is that we should have unity and faith—confidence in each other. The execution, however, is more difficult. The responsibility of American leadership in this connection is truly a heavy one. To a large extent the future of the free society of the N.A.T.O. peoples depends upon the success we have in exercising that leadership. You have heard that there is a growing anti-American feeling in Europe.

It is true there is a slight increase, but it is not significant. There is, of course, an incessant Communist stream of anti-American poison, and some of it takes effect. It is natural that there would be some irritation because proud nations with glorious traditions are not going to be too enthusiastic about accepting the leadership of a young country. I do not find much anti-American sentiment. If you think there is anti-American sentiment in Western Europe, you should know that the magnitude of anti-Soviet feeling in East Germany is at least ten times as great.

What I do find, however, is an increasing concern whether or not we Americans as a people have the necessary maturity to lead the world through this critical struggle. The European press devotes considerable space to pronouncements on foreign affairs by prominent Americans in all spheres of activity. Many of these Americans hold no official position and are not speaking for the U.S. Government. Some of the pronouncements are very helpful; others are damaging. The European reader is frequently unable to distinguish whether or not these are declarations of official U.S. policy. He reasons that if the statements are sufficiently important to appear in print 3,000 miles from their source, there must be something behind them. Our problem is essentially a task of being the strongest element in the North Atlantic Community and still being sufficiently modest and understanding to work well within it. We must be able to work effectively on a partnership basis with a profound respect for views and interests other than our own. The one thing that the European resents—and naturally so—is dictation.

One of the very special dangers which all of us in N.A.T.O. must guard against is the unbridled criticism of our allies. I'd like to cite France as a case in point. As you know, France is beset with very serious internal problems at the present time. A large number of Americans come to France each summer, and a good many of them become experts on the country in the two or three days or weeks they are there. All too often the net result is caustic criticism of France. Now let's see how the French look at themselves:

An official French Commission which made a comprehensive study (Statistiques et Etudes Financieres, No. 18, 1953) of the French economy recently had these harsh criticisms to make:

> Tax dodging and special privileges contribute powerfully to France's economic difficulties. The French economy employs too much manpower to produce too little. Controlled competition results in prices which are no longer the consequence of economic laws.

Last Sunday M. Faure, French Minister of Finance and Economic Affairs, in a stern warning to the nation that reforms must be made, said:

> The French system is becoming a system of vested interest and privilege—not a reward for enterprise. No premium is put on initiative, but a premium *is* put on intrigue. The disease of unfair taxation is gnawing the nation.

I have read you these criticisms by Frenchmen of their own system to show you that, for the most part, they have identified their own difficulties, and in very severe terms. The French Parliament assembled only the day before yesterday. One of its early tasks undoubtedly will be to seek a solution for these problems. The government is faced with the job of trying to push a very heavy rock up an extremely steep hill. That is not an easy task, and progress will probably be slow.

You frequently hear that the French have an unstable form of government; that the Cabinet has fallen eighteen times since the war; and that there have been thirteen different Prime Ministers in the same period. All of those statements are true. What you seldom hear, however, is that France has had only two Foreign Ministers during that period, M. Bidault, the present incumbent, and M. Robert Schuman. Nearly every other country in Europe—and the United States, too—have had more Foreign Ministers since the war than the French. The foreign policy under Bidault and Schuman has not only been stable and steadfastly encouraging, particularly with respect to N.A.T.O., but also France has taken the leadership in ideas and it is around France that the notion of a united Europe is slowly but steadily becoming a reality.

It disturbs me that because of the serious internal problems which France is facing, doubts are expressed from time to time questioning her military capabilities. Would she have the will to fight in an emergency? Is she a valuable ally? We have made a thorough analysis of both of those questions at SHAPE and our answer is an unqualified "yes." I can say categorically that there is no question in our minds but that the French will fight effectively if an emergency should develop. They fought gloriously in Korea, and they are at this very moment fighting gallantly in Indo-China.

The Indo-China war has been a terrific burden on France for almost seven years, both from a standpoint of casualties and financial considerations. The United States has recently given additional help to alleviate the financial burden of the Indo-China conflict, and the French are most grateful. However, there is nothing that money can do to recompense for the many officers who are killed or totally disabled each year—practically the equivalent of the annual output of the French West Point. The Indo-China war is your problem as well as theirs, for it is being conducted in defence of a free world.

I have taken this time to discuss some aspects of the French situation with you because I think there is considerable misunderstanding about it, which might lead to strains in our alliance.

As for the future, I have faith in France. I am convinced that not only does France need us, but that we need her too. It is in the interest of the entire Western world that she be given genuine understanding as she tries to solve the problems which are agonising her at this time. The defence of Europe is practically impossible unless we have the leadership and active cooperation of France.

I have singled out France as an example for particular attention. But my failure to mention any other country in N.A.T.O. by no means implies that its troops will not fight, that it doesn't have an important rôle in N.A.T.O., or that it may not be having severe internal economic problems also. As a matter of fact, all N.A.T.O. nations do have problems, and they do have vitally important rôles to perform. Moreover, I am supremely confident that all N.A.T.O. forces would fight with great bravery if an aggressor should attack.

We are facing a period ahead when service to the cause of freedom must be given unselfishly by the North Atlantic peoples. From my experience I am confident that the people will make these sacrifices if they understand the reasons, and if they believe that N.A.T.O. can be an effective agency to preserve the peace. It is especially appropriate that you should consider this subject tonight as you have assembled here to pay homage to the memory of a man who devoted his life to the service of his country.

Whether we like it or not, American destiny and the destinies of our partners in freedom are inextricably interwoven. We shall solve this problem of survival together and in common, or we shall not solve it at all. Let us make no mistake about that. No nation—not even our own—is sufficient unto itself today. When even the smallest of our partners in freedom suffers a serious mishap, it is the old eternal cry of John Donne again: "Never send to know for whom the bell tolls. It tolls for thee." Though we forgot all else, this we should not forget.

Our modest strength is beginning to reap dividends. It would be a tragedy if we should weary and falter now.

Never was there a greater need among the N.A.T.O. nations for unity, for wisdom, and for perseverance. Never was there a greater need to demonstrate that we who have inherited freedom have not forgotten the value of the heritage nor lost the will to defend it.

GLOSSARY OF N.A.T.O. TERMINOLOGY

(*See diagrams which follow*)

North Atlantic Treaty Organisation (*N.A.T.O.*)—Is the name given to the political entity which came into being as a result of the North Atlantic Treaty. It is composed of the signatories of the Treaty: Belgium, Canada, Denmark, France, Iceland, Italy, Luxembourg, the Netherlands, Norway, Portugal, the United Kingdom and the United States. Greece and Turkey acceded to the Treaty in February, 1952. (N.A.T.O. should not be confused with S.H.A.P.E., which is N.A.T.O.'s European Military Command.)

North Atlantic Council (*N.A.C.*)—Supreme authority of the North Atlantic Treaty Organisation. The North Atlantic Council is composed of ministerial or cabinet representatives for foreign affairs, finance, and defence of the 14 nations. For matters within the purview of the Alliance, the Council is, in effect, an international cabinet. The Ministers meet periodically, but their permanent representatives are in continuous session in Paris (Palais de Chaillot).

Secretary General—The Secretary General controls the International Staff Secretariat of the North Atlantic Council. He is also Vice Chairman of the Council and in the Chairman's absence presides over weekly meetings of the Council's permanent representatives ((Palais de Chaillot).

Military Committee—Comprised of the Chiefs of Staff of each N.A.T.O. nation. Iceland, having no military establishment, may be represented by a civilian. This committee is the primary military advisory group to the North Atlantic Council. (It meets, as necessary, usually prior to a meeting of the full Council.)

Standing Group—The permanent working group of the Military Committee and the immediate superior military body to which N.A.T.O. Supreme Commanders are responsible. It comprises military representatives of France, the United Kingdom, and the United States. It also exercises jurisdiction over the N.A.T.O. Defence College (in Paris) and the Military Agency for Standardisation (in London), Communications Agencies in Europe, Advisory Group Aeronautical Research and Development (Paris) and Air Training Advisory Group (Paris). It acts as the agent of the Military Committee and also as the steering and executive agent of the Military Representatives Committee. The Standing Group is in continuous session in Washington, D.C.

Military Representatives Committee—When the military committee is not in session, the Military Representatives Committee which comprises representatives of the Chiefs of Staff of the North Atlantic nations, is authorised to deal with military matters (except certain matters of of broad policy and strategy) requiring consideration by National Chiefs of Staff or Governments. The Chairman of the Standing Group is also Chairman of the Military Representatives Committee. The Standing Group, in discharging its functions, takes full account of the views of the Military Representatives Committee in all military matters which involve action by any National Chiefs of Staff or Government. (The Military Representatives Committee is in permanent session in Washington, D.C.)

Supreme Headquarters Allied Powers Europe (*S.H.A.P.E.*)—The Supreme International Military Headquarters for Europe of the North Atlantic Treaty Organisation. S.H.A.P.E. should not be confused with N.A.T.O. The Supreme Allied Commander Europe (S.A.C.E.U.R.) is directly responsible to the Standing Group of the Military Committee. His headquarters are at S.H.A.P.E. (outside Paris). He has six major sub-commands: Allied Forces Northern Europe; Allied Forces Southern Europe; Allied Land Forces Central Europe; Allied Air Forces Central Europe; Flag Officer Central Europe; and Allied Forces Mediterranean.

Allied Forces Northern Europe (*A.F.N.E.*)—The Northern sub-command of the Allied Command in Europe. It covers Norway and Denmark and waters adjacent thereto. Danish and Norwegian sea and air forces supplemented by British sea and air forces and U.S. air forces comprise this command. (Headquarters in Oslo.)

Allied Forces Southern Europe (*A.F.S.E.*)—The Southern sub-command of the Allied Command in Europe. It covers Italy, Greece, and Turkey. Italian, Greek, and Turkish land and air forces supplemented by U.S. Air Forces and the Sixth U.S. Fleet, as a striking force for the support of land operations, comprise this command. (Headquarters in Naples.)

Allied Forces Central Europe (*A.F.C.E.*)—The Central European sub-command of the Allied Command in Europe. It covers Western Germany, France, and the Benelux countries. Belgian, British, Canadian, Dutch, French, Luxembourg, and U.S. forces comprise this command. (Headquarters in Fontainebleau.)

Allied Forces Mediterranean (*A.F.M.E.D.*)—The newest integrated command under S.H.A.P.E., responsible for naval operations in the Mediterranean. (Headquarters in Malta.)

Supreme Allied Command Atlantic—The Supreme Allied Command for the Atlantic area. This Command is directly responsible to the Standing Group in the same way as S.H.A.P.E. (Headquarters in Norfolk, Va., U.S.A.)

Channel Committee—Consists of high naval representatives of Belgium, France, the Netherlands, and the United Kingdom, to which the Allied Commander-in-Chief, Channel, and the Allied Com-in-Chief Maritime Air Channel, report. (Meets in London.)

Allied Channel Command—The operational area of the Channel Command is the English Channel and the southern area of the North Sea. It comprises principally British naval forces. The Allied Commander-in-Chief, Channel Command (C.I.N.C. Channel) reports to the Channel Committee; except that, for certain operational matters, he deals directly with the Standing Group. (Headquarters at Portsmouth, England.)

Maritime Air Channel Command—The Allied Maritime Air Channel Command comprises the Allied Air correlate of the Channel Command. The Allied Commander-in-Chief Maritime Air Channel has equivalent status to the Allied C.I.N.C. Channel, and reports to the

Channel Committee and Standing Group in the same manner. (Headquarters in Northwood, Middlesex, England.)

Canada—United States Regional Planning Group—Develops for and recommends to the Military Committee, through the Standing Group, plans for the defence of the Canada–United States region. Like the Supreme Allied Commanders, it is directly responsible to the Standing Group. (Meets in Washington.)

N.A.T.O. Defence College—Trains senior officers and civilians from all N.A.T.O. nations who are to serve in key N.A.T.O. capacities. (Located in part of the Ecole Militaire building in Paris.)

Military Agency for Standardisation (*M.A.S.*)—Subsidiary agency of the Standing Group. Its purpose is to facilitate standardisation of equipment and supplies among the armed forces of the N.A.T.O. nations. (Located in London.)

European Military Communication Coordination Committee (*E.M.C.C.C.*)—A Working Party of the Standing Group to deal with signal matters pertaining to the defence of Western Europe and associated N.A.T.O. areas. (Headquarters in Paris.)

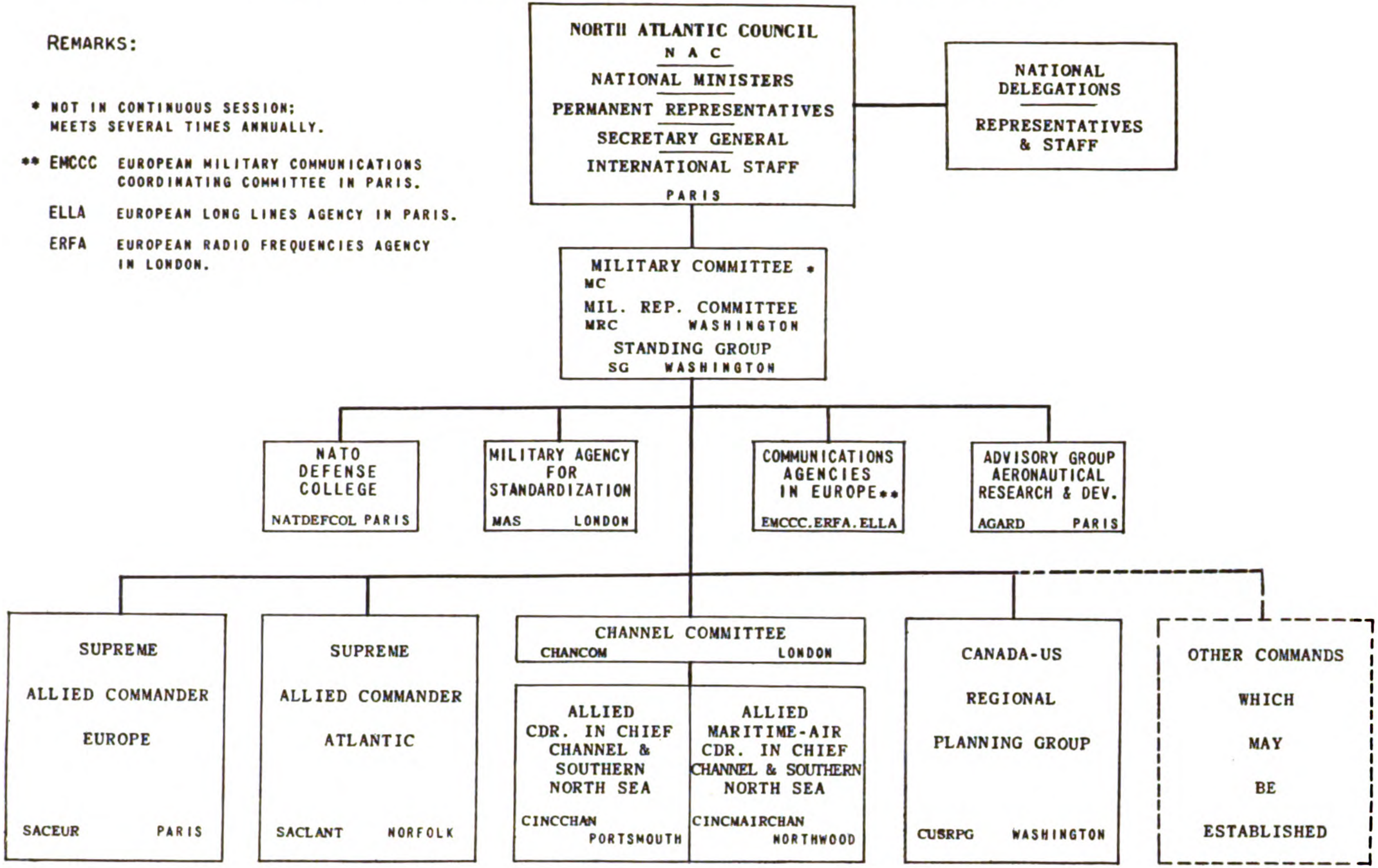
European Long Line Agency (*E.L.L.A.*)—Studies all matters relating to the use of national telecommunication facilities by the N.A.T.O. armed forces in Europe. (Headquarters in Paris.)

European Radio Frequency (*E.R.F.A.*)—Collects all available information on radio frequencies and prepares plans for allocation and assignment of frequencies. (Headquarters in London.)

Advisory Group Aeronautical Research and Development—The object of this group is to bring together leading aeronautical personalities of the N.A.T.O. nations with a view to recommending effective ways of utilising their respective research and development personnel and facilities for the common benefit of the N.A.T.O. community. (Headquarters in Paris.)

Air Training Advisory Group—The object of this group is to recommend to the Standing Group improvement of agreed N.A.T.O. Air Force standards and to recommend to National Air Forces action concerning the improvement in training methods, in order to achieve those standards. (Headquarters in Paris.)

NORTH ATLANTIC TREATY ORGANIZATION



REMARKS:

* NOT IN CONTINUOUS SESSION;
MEETS SEVERAL TIMES ANNUALLY.

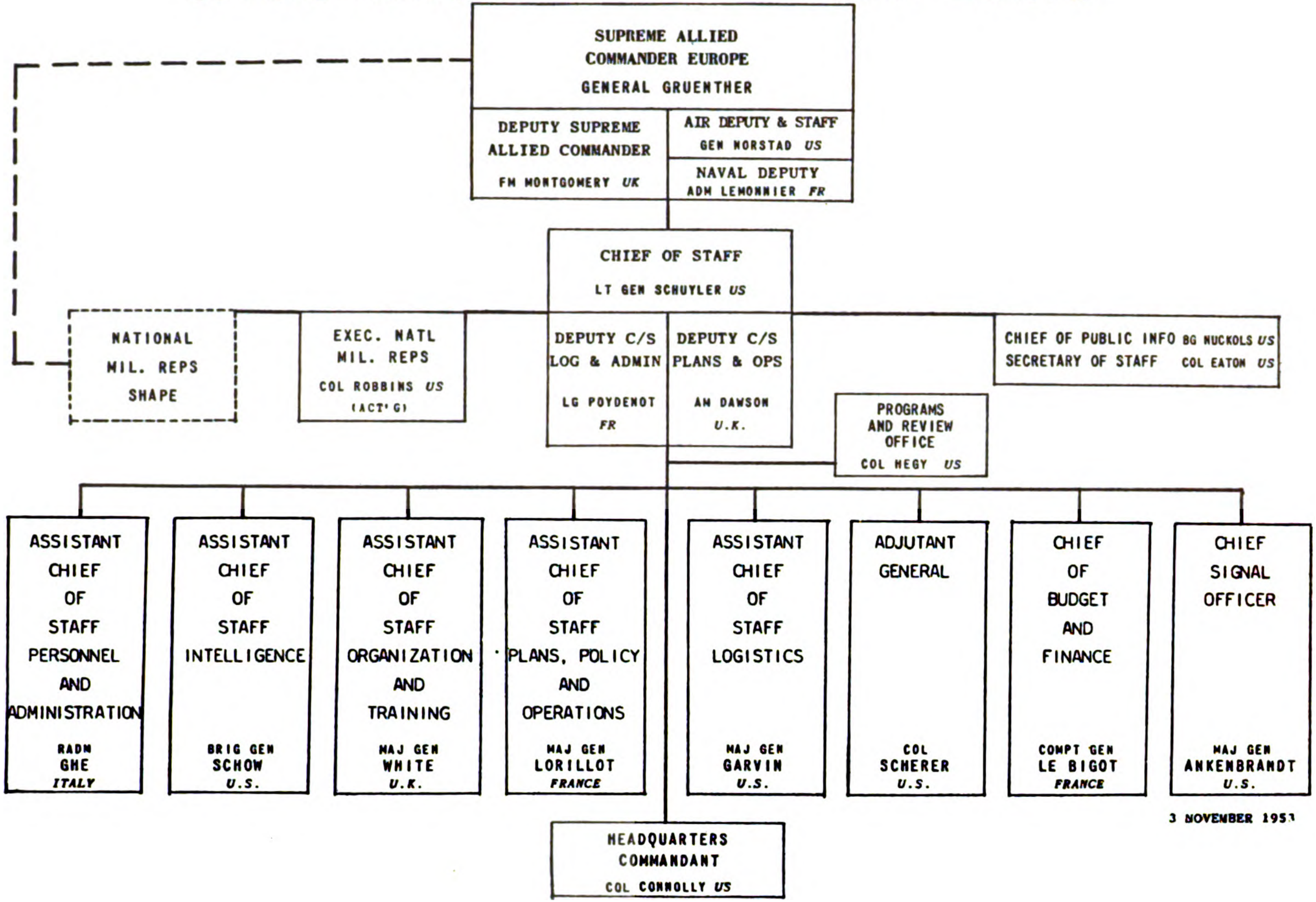
** EMCCC EUROPEAN MILITARY COMMUNICATIONS COORDINATING COMMITTEE IN PARIS.

ELLA EUROPEAN LONG LINES AGENCY IN PARIS.

ERFA EUROPEAN RADIO FREQUENCIES AGENCY IN LONDON.

3 NOVEMBER 1953

SUPREME HEADQUARTERS ALLIED POWERS EUROPE



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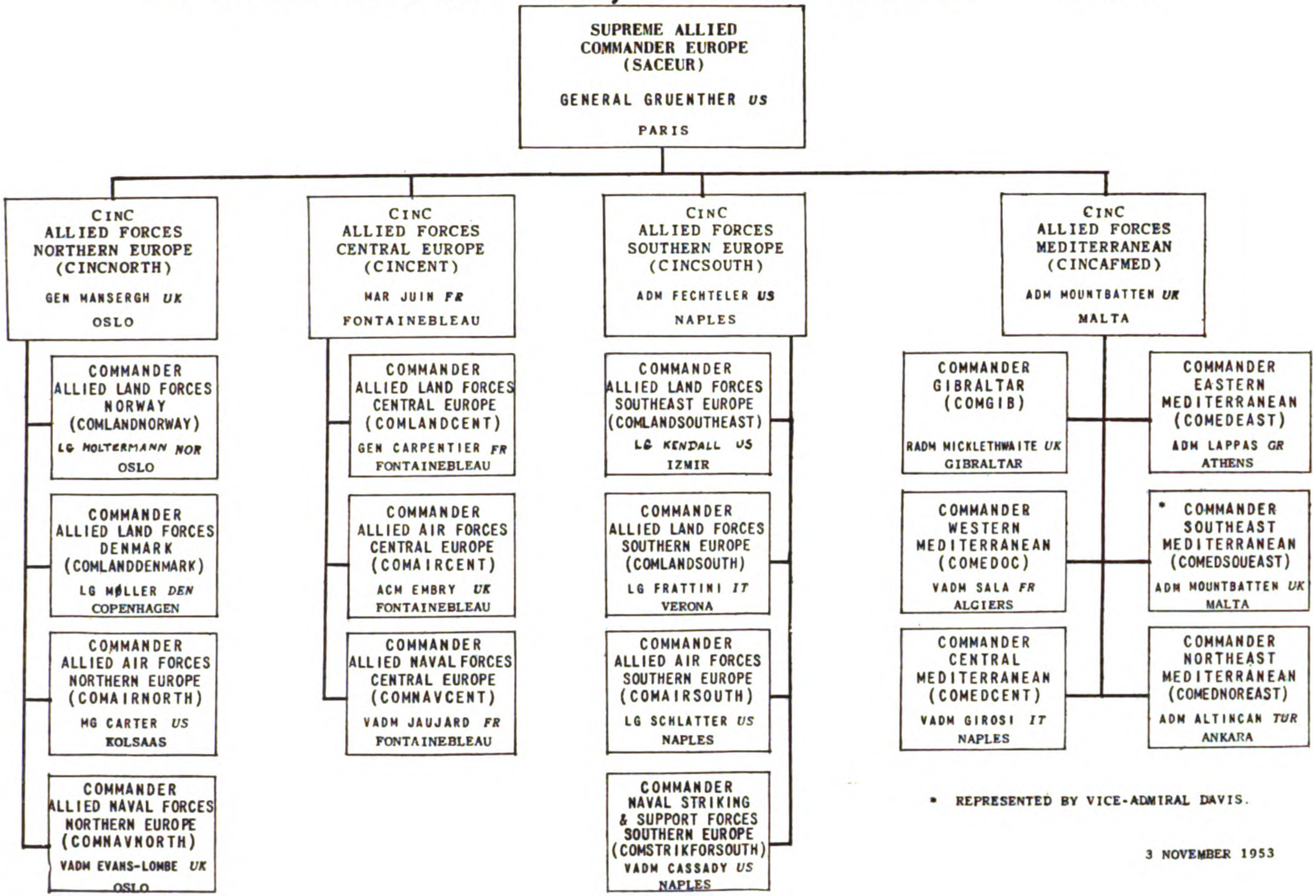
PRINCIPAL HEADQUARTERS, ALLIED COMMAND EUROPE


SUPREME ALLIED COMMANDER EUROPE (SACEUR) GENERAL GRUENTHER US PARIS
CINC ALLIED FORCES NORTHERN EUROPE (CINCNORTH) GEN MANSERGH UK OSLO
COMMANDER ALLIED LAND FORCES NORWAY (COMLANDNORWAY) LG MOLTERMANN NOR OSLO
COMMANDER ALLIED LAND FORCES DENMARK (COMLANDDENMARK) LG MØLLER DEN COPENHAGEN
COMMANDER ALLIED AIR FORCES NORTHERN EUROPE (COMAIRNORTH) MG CARTER US KOLSAAS
COMMANDER ALLIED NAVAL FORCES NORTHERN EUROPE (COMNAVNORTH) VADM EVANS-LOMBE UK OSLO
CINC ALLIED FORCES CENTRAL EUROPE (CINCENT) MAR JUIN FR FONTAINEBLEAU
COMMANDER ALLIED LAND FORCES CENTRAL EUROPE (COMLANDCENT) GEN CARPENTIER FR FONTAINEBLEAU
COMMANDER ALLIED AIR FORCES CENTRAL EUROPE (COMAIRCENT) ACM EMBRY UK FONTAINEBLEAU
COMMANDER ALLIED NAVAL FORCES CENTRAL EUROPE (COMNAVCENT) VADM JAUJARD FR FONTAINEBLEAU
CINC ALLIED FORCES SOUTHERN EUROPE (CINCSOUTH) ADM FECHTELER US NAPLES
COMMANDER ALLIED LAND FORCES SOUTHEAST EUROPE (COMLANDSOUTHEAST) LG KENDALL US IZMIR
COMMANDER ALLIED LAND FORCES SOUTHERN EUROPE (COMLANDSOUTH) LG FRATTINI IT VERONA
COMMANDER ALLIED AIR FORCES SOUTHERN EUROPE (COMAIRSOUTH) LG SCHLATTER US NAPLES
COMMANDER NAVAL STRIKING & SUPPORT FORCES SOUTHERN EUROPE (COMSTRIKFORSOUTH) VADM CASSADY US NAPLES
CINC ALLIED FORCES MEDITERRANEAN (CINCAFMED) ADM MOUNTBATTEN UK MALTA
COMMANDER GIBRALTAR (COMGIB) RADM MICKLETHWAITE UK GIBRALTAR
COMMANDER EASTERN MEDITERRANEAN (COMEDEAST) ADM LAPPAS GR ATHENS
COMMANDER WESTERN MEDITERRANEAN (COMEDOC) VADM SALA FR ALGIERS
* COMMANDER SOUTHEAST MEDITERRANEAN (COMEDSOUEAST) ADM MOUNTBATTEN UK MALTA
COMMANDER CENTRAL MEDITERRANEAN (COMEDCENT) VADM GIROSI IT NAPLES
COMMANDER NORTHEAST MEDITERRANEAN (COMEDNOREAST) ADM ALTINCAN TUR ANKARA

* REPRESENTED BY VICE-ADMIRAL DAVIS.

3 NOVEMBER 1953

INDEX

INDEX

Adams, Mr. M. E., 409
Adenauer, Dr., 154
Admiralty Office, reduction in staff, 409
Aeroplane, The, 345, 354
Aircraft: all-jet bombers, 362; anti-submarine, 357; Canberras, 26, 27; development, 340–60; flying boats, 363; Gannets, 19; Harvards, 25; helicopters, 363; Hunters, 8, 26, 85, 135, 137, 183, 441; Javelins, 26; jet fighters, 347; Lincolns, 25; means of propulsion, 343; military transports, 350, 362; Neptunes, 316; Sea Hawks, 8, 19; Sea Mews, 19; Sea Venoms, 19; Shackletons, 137, 317; single-jet fighters, 361; Swifts, 8, 25, 26, 85, 135, 137, 441; twin-jet fighters, 361; Valiants, 8, 26, 135, 137; Vampires, 26; Victors, 26; Vulcans, 26; Wyverns, 8, 19
Air Estimates, 1954–55...448–51
Air Pictorial, 340, 341, 346
Air Vice-Marshal Chilton, 358, 360
Alam el Halfa, battle of, 38
Alexander, Field Marshal, 294, 298, 299
Allenby, General, 275
All the World's Aircraft, 349, 353, 359
Amiens, second battle of, 296
Anderson, Mr. Robert B., 257
Andrews, Vice-Admiral Sir William G., 16
Appleton, Sir Edward, 29
Army: air power, 200; air support, 180–82; appointments, 22; armaments, 429; atomic weapons, 35, 47, 432; Austria, 423; B.A.O.R., 21, 422; battle procedure, 304; British Guiana, 413; comparison of strengths, 436; Canal Zone, 413; Cyprus, 420; defence, 375, 376; education, 434; equipment, 11, 302, 430; Far East, 415; garrisons abroad, 21; Glosters in Korea, 36; health, 434; helicopters, 26; Jordan, 420; Kenya, 413, 420; Korea, 413; Libya, 419; locomotive, 201; long-range guns, 200; Malaya, 331, 416; manpower, 424; married quarters, 433; morale, 48; National Servicemen, 425; Northern Army Group, 21; notable victories, 293; officers, 426; pay, new rates, 454, 457; personal services, 23; recruiting, 425, 437; Reserve, 428; strength, 19; Territorial, 21, 428; training, 302, 424; transport, 201–02; vulnerability, 180; weapons, 45
Army and Air Force Acts: Part I, 158, 159; Select Committee, 158
Army Estimates, 1954–55...438–39
Argentina Navy, 273
Armed Forces (Housing Loans) Act of 1953...441, 446
Atherton, Charles, 368
Attlee, Mr. C., 154
Aviation (American Journal), 354

Baldwin, Mr. Hanson, 115
Baker, Air Chief Marshal Sir John, 27
Bardia, battle of, 295, 296
Belgium Navy, 269
Beresford, Lord Charles, 33
Beria, execution of, 59
Bevan, Mr. A., 154
Bidault, M., 476
Birch, Mr. Nigel, 156
Blackett, Professor P. M. S., 357, 360
Bolshevik revolution, the, 61
Bomber, the: abuses, 50; Casablanca directive, 53; future, 54–58; "Pure" Bomber School, 50; Support School, 51, 52; uses, 49
Boothman, Air Marshal Sir John, 27
Bourne, Lieut.-General G. K., 22
Boyd Trophy, 408
Boyle, Air Marshal Sir Dermot A., 26, 27
Bradley, General Omar, 117, 173
Brazilian Navy, 273
Brind, Admiral Sir Patrick, 9
British Guiana, 8, 400, 413, 424
British North Greenland Expedition, 31, 318
Broadhurst, Air Vice-Marshal Sir Harry Broadhurst, 27
Bufton, Air Vice-Marshal S. O., 28
Bulgarian Navy, 274
Burnham, Mr. James, 114
Burton, Flight-Lieutenant R. L. E., 134
Butler, Mr. R. A., 150
Butler, Professor J. R., 146

Canadian Air Force, 168–69
Canadian Army, 168–69
Cahn, Mr. C. M., 159
Canadian Defence: background, 160; Fenian Raids, 161; future, 171; Militia Act, 160; National Defence Act, 166; North-West Rebellion, 161; officers, 166; Research Board, 171; Red River Rebellion, 161
Canadian Navy, 167–68
Carney, Admiral R. B., 9, 173, 257
Carpentier, General M. M., 9
Casablanca, Conference of, 119
Cassady, Vice-Admiral John, 257
Castries, Col. Christian de, 249
Catroux, General, 242
Central Flying School, 313
Central Gunnery School, 313
Chamberlain, Mr. N., 221
Chilton, Lieut.-General M. S., 23
Chinese Air Force: parachute troops, 90; weaknesses, 89, 90
Chinese Navy, 274
Chinese Revolution, the, 62
Churchill, Sir Winston, 14, 20, 152, 360, 373
Civil Service pensions, 460–68
Clausewitz, 104, 200, 293, 296
Cloy, Mr. John J., 120
Coad, Major-General, B. A., 129
Cogny, General, 257

Cold War, the, 72, 73
Colombian Navy, 274
Combat Forces Journal (American), 172
Combs, Vice-Admiral, 260, 288
Comet air-liner, crash off Elba, 402
Commonwealth Tour, Royal, 402
Cooper, Major-General K. C., 23
Corbett, Sir Julian, 146
Couchman, Rear-Admiral W. T., 16
Cranwell College, 24
Cranwell Scholarship Scheme, 138
Creasy, Admiral Sir George, 286, 399
Crossman, Mr. R., 152
Cruise, Rear-Admiral, 290
Cunningham, Admiral of the Fleet, Lord, 29
Currie, Sir Arthur, 162
Cuthbert, Rear-Admiral J. W., 10
Cyprus earthquakes, the, 402
Czechoslovakian Air Force: purge of, 86; strength, 87, 88; training, 87

Danish Navy, 269
Dartmouth Naval College, 229, 231
Davis, Vice-Admiral W. W., 16
Defence: budget, 396; Cold War, the, 374, 376; Colonial commitments, 374, 383; Commonwealth co-operation, 388; heavy burden, 374; home, 383; manpower, 379–81; military aid, 385; Mutual Defence Assistance, 399; National Service Scheme, 383; production, 384; statement on, 373; support aid, 413
Defence, Civil: Auxiliary Fire Service, 391; Coventry City Council, 150; Corps, 391; Fire Service College, 392; Home Guard, 392; mobile columns, 156; National Hospital Service Reserve, 391; Staff College, 397
Defence, Western Europe: atom bomb, 93, 94; communications, 97; new weapons, 94; North German Plain, 95; Ruhr, the, 96, 97; Western Desert, 92
Denny, Admiral Sir Michael M., 16
Desert Air Force, 194
Drake, Sir Francis, 323
Duncan, Admiral Donald, 257
Dunkirk, withdrawal from, 38
Dulles, Mr. John Foster, 121, 174–76, 178

East Coast Floods, 318
Eaton, Major-General, 10
E.D.C.: German contribution, 391; ratification, 471
Edelsten, Admiral Sir John, 285, 286
Egypt: Canal Zone, 8, 15, 20, 21
Eisenhower, President, 55, 121, 172–74, 176–78, 257, 263
El Alamein, battle of, 39, 183
Eldridge, Lieut.-General W. J., 23
Ely, General, 251
Embry, Sir Basil, 9
Erskine, Lieut.-General Sir George, 14, 22
Estimates: Air, 1954–55...448–51; Army, 1954–55...438–39; Naval, 1954–55... 410–11
Evans, Lieut.-General G. C., 22
Exercises: *Air Defence.*—Heads Up, 10. *Bomber Command.*—Jungle King, 319, 442. *Continental.* — Coronet, 442; Grand Repulse, 10; Holdfast, 10, 92. *Defence.*—Momentum, 26, 319, 442. *Maritime.*—Mariner, 10, 259, 285–89, 319, 389, 400–05, 442; Weldfast, 389–92, 389, 400.

Faure, M., 475
Fawkes, Rear-Admiral G. B. H., 16
Fechteler, Admiral William, 9, 257, 287, 291, 470
First World War: bombers of the, 50; friction between Allies, 129; lessons of, 294; patrolling, 132; period of stalemate, 95
Fisher, Lord, 145
Fleet Air Arm, memorial to, 409
Flight, 342
Foch, Marshal, 100
Fogarty, Air Chief Marshal Sir Francis, 27
Fontainebleau Conference, the, 243
French Navy, 266–67
Fuller, General, 303

Gannon, Flight-Lieut. D. H., 134
Garthoff, Raymond L., 63
Gaulle, General de, 242
Gaza, third battle of, 293
Germany, communications, 101
Gladstone, Rear-Admiral G. V., 16
Gliding: Air Training Cadet, 209; Air Training Corps, 205; British requirements, 209; German, 205; hill-lift, 206; thermal upcurrents, 206; use of, 205; wave-lift, 207; World Championships, 210
Glubb, General, 420
Godfroy, Admiral, 266
Goltz, Baron von der, 113
Greek earthquakes, the, 401
Grew, Mr. Joseph, 113, 120
Gruenther, General A. M., 9, 285, 470

Harding, General Sir John, 23
Hart, Captain Liddell, 294
Head, Mr. Antony, 23, 153, 156, 157
Henderson, Sir Nevile, 99
Her Majesty Queen Elizabeth II, 7, 28, 134, 318, 399, 400, 409, 443
Hitler, Adolf, 60, 64
Hobart, General, 279
Hobbs, Major-General R. G. S., 23
Home Guard: exercises by, 8; strength of, 383, 429
Hong Kong, 418
H.R.H. the Duchess of Kent, 409
H.R.H. the Duke of Edinburgh, 18, 31, 399
Hughes, Sir Sam, 162
Hull, Cordell, 243

Imperial Defence College, 1, 14
Indian Navy, 16, 400
Indo-Chinese War, 241 et seq.
Indonesian Navy, 274
Italian Navy, 268–69
Ivelaw-Chapman, Air Marshal Sir Ronald, 27

Japanese Navy, 274
Jaujard, Vice-Admiral, 9
Joint Anti-Submarine School, 1, 314
Joint Staff College, 1
Jones, Major-General C. P., 23
Juin, Marshal, 9, 470

Keightley, General Sir Charles F., 22
Kenya: Mau Mau Society, 13; operations, 13, 14, 20
Kesselring, Field Marshal, 119, 196
Kikuyu Guard, strength of, 421
Kinkaid, Admiral, 147
Kirkman, General Sir Sydney, 427
Kitchener, Lord, 198
Korean War: aircraft, 133; airpower, 180; American Divisions, 131; armistice, 8, 12; Asiatic economy, 126; British casualties, 8; clothing, 130; Commonwealth division, 219, 414, 415; forces in, 12; "Katcoms," 415; mistakes, 122; naval casualties, 401; operations, 124, 127; patrolling, 132; Royal Marine casualties, 401; service in, 8; tanks, 125;
Kremlin, the, 59, 61, 72
Kyes, Mr. Roger, 173

Lambert, Major-General W. H., 23
Lang, Sir John, 29
Lappas, Vice-Admiral, 290
Lattre, General de, 246
Lenin, V. I., 65
Leyte Gulf, battle of, 147
Linklater, Eric, 129
Lloyd George, 221
Loewen, Lieut.-General Sir Charles F., 22
London to New Zealand Air Race, 18, 134, 443
Lorimers, Sir Robert, 29
Luard Committee, 227
Ludendorff, General, 113
Luftwaffe, the, 51, 200

MacArthur, General, 121
Macfadyen, Air Vice-Marshal D., 28
Madden, Admiral Sir Alexander C. G., 16
Maginot Line, the, 39
Mahan, Admiral, 2
Malaya: anti-terrorist campaign, 327; Cold War, 329, 330; Communist Party, 327, 328; general situation, 330; improved position, 8; operations in, 13; recent developments, 335–39
Malayan People's Liberation Army, 253
Mansergh, General Sir Robert, 9, 470
Marines, Royal, 18, 33
Marshall, General George, 116
Matador, pilotless bomber, 237
Matsuoka, Mr., 113
Mau Mau, tactics by, 421
Maxwell Air Force Base, 102
McCormick, Admiral Lynde, 10, 257, 285
McGrigor, First Sea Lord, Sir Rhoderick, 29
McLean, Major-General Sir Kenneth, 159
Mechanical Engineering (American Journal), 356
Meteorology, new methods, 447
Meyer, General Kurt, 298
Middle East: British interests, 155
Middleton, Sir Frederick, 161
Military Training Act, 1939...221
Miller, Sir James, 29
Missiles, guided: American progress, 236; British developments, 235
Mitchell, Major-General F. N., 23
Molotov, Mr., 90
Monroe Doctrine, the, 67
Montague Committee, 230–32
Montgomery, Field Marshal, 38, 294
Mountbatten of Burma, Admiral the Earl, 38, 289, 290, 294, 470
Murray, Major-General H., 23
Mutual Defence Assistance, 399

N.A.A.F.I., 29, 33, 434
Napoleon, 200
Napoleonic Wars, 122
National Institute of Oceanography, 31
National Service, 212, 222, 224
N.A.T.O Annual Review, 1953...389; atomic phase in war, 93; atomic threat, 474; basis of agreement, 152; bomber force, 190; Commonwealth collaboration, 406; defence forces, 470; East Germany, 475; E.D.C., 390, 471; general survey, 9–10; glossary of terminology, 478–80; hydrogen bomb, 473; Indo-Chinese War, 476; "Infrastructure," 389; long-term programme, 172; maritime air forces, 316; national service, 470; naval/air operations, 319; naval exercises, 400; need for unity, 477; Paris meeting, 388; purpose of, 474; research aircraft, 138; sea communication, 3; Soviet policy, 473; strength, 471; U.K. financial contribution to, 390
Navarre, General, 248, 249
Navy, Army and Air Force Reserves Act, 382
Navy, Army and Air Force Reserves Act 1954...11
Naval engineering: boilers, 366; days of sail, 365; engineering factors, 365; fresh water, 370; fuel oil, 366; habitability, 371; spare parts, 368; steam turbine, 368
Naval Estimates, 1954–55, 410–11
Navigation School, 308
Navy, Royal: angled deck, the, 30; appointments, 16; Asdics, 5; communications, 3; construction, 15, 403; conversion, 404; Coronation review, 399; defence, 375, 376; entry, 16, 17; entry of officers, 225, 229-36; estimates, 1954–55...398; fishery protection, 402; Fleet Air Arm pilots, 406; helicopters, 32; Korea, 16, 400; "M.A.C." ships, 4; Malaya, 332, 400; material, 18–19; Mine-watching Services, 17; modernisation, 18; Naval Reserve, 17; pay, new rates, 453, 456; personnel, 16, 17, 406; re-engagement, 407; re-equipment, 15; research, 405; reserve fleet, 401; "showing the flag," 33; task of, 15; Stations, 320; termination of emergency manpower measures, 406; training of officers, 225;

transfer of ships, 401; Volunteer Reserve, 17; war memorials, 409; works programme, 408
Neale, Professor, 103
Netherlands Navy, 270
New Zealand Navy, 16, 400
Nicholl, Admiral, 148
Nicholson, General Sir Cameron G. G., 22
"Nike," guided missile, 237
Mimitz, Admiral, 147
Normandy, battle of, 296, 301; landings in, 39
Norrie, General, 295
Norstadt, General Lauris, 9
Norway: Civil Defence, 10; Home Guards, 10; Navy, 271
North, Lord, 225

Oliver, Admiral Sir Geoffrey, 16

Parham, Vice-Admiral F. R., 16
Pay, Services, 15, 452, 459–69
Pearl Harbour, battle of, 146, 147
Pelly, Air Marshal C. B. R., 27
Peruvian Navy, 273
Pike, Air Marshal T. G., 27
Pile, General, 294
Polish Air Force: Soviet control, 88; strength, 88
Portuguese Navy, 271
Postan, Professor, 114, 117
Potsdam Agreement, the, 243

Q.A.R.A.N.C.: below strength, 21, 427; intake of officers, 427; part-time nursing, 427
Queen Elizabeth I, 105, 186

Radford, Admiral Arthur 173, 177
R.A.F.: airborne forces, 183–85; anti-aircraft defence, 180; anti-aircraft weapons, 5; appointments, 27; Auxiliary Air Force, 26; Bomber Command, 25; Casualty-transport, 185; Coastal Command, 442; commissions, 24; conversion units, 312; defence, 375, 378; equipment, 26; expansion, 137; Fighter Command, 26; Flying Training Command, 310; future of, 140; guided weapons, 135, 136; helicopters, 26, 186; inter-service co-operation, 187–88; Malaya, 331; manning, 138; married quarters, 446; Middle East Air Force, 32; National Servicemen, 139; night reconnaissance, 182; outstanding events, 134; pay, new rates, 139, 455, 458; personnel, 444; re-equipment, 447; reserves, 34; review, 443; rockets, 7; royal review, 134; runways, 446; sea communications, 316; Second Tactical Air Force, 442; strategic bombing, 316; strength, 24; Tactical Air Force, 317; Technical Training Command, 445; training, 25, 306–11, 313, 319; Transport Command, 25, 317, 445; Volunteer Reserve, 139; works services, 446
R.C.A.F., Exercise Mariner, 286
Raleigh, Sir Walter, 6
Reed, Sir Edward, 365
Reid, Rear-Admiral J. P. L., 10
Rice Committee, 227
Richmond, Admiral Sir Herbert, 102, 143, 144, 231
Ridgway, General Matthew B., 9
Ridgway, General Nathaniel F., 173
Rommel, Field Marshal, 38, 119, 127, 193, 198
Roosevelt, ex-President, 243
Roskill, Captain Stephen, 146
Roumanian Navy, 271
Rowse, A. L., 99
Royal Air Force Estimates, 153
Royal Australian Navy, 401
Royal Commonwealth Tour, 399
Royal Flying College, 314
Royal Marines, 33
Royal Marine Forces Volunteer Reserve, 408
Royal Military Academy at Sandhurst, 17, 426
Royal Military College of Science, 17, 426
Royal Naval Mine-watching Service, 17, 383
Royal Naval Patrol Service, memorial to, 409
Royal Naval Reserve, 17
Royal Naval Reserve (General Service), 408
Royal Naval Special Reserve, 408
Royal Naval Volunteer Reserve, 17, 408
Royal Naval Volunteer Supplementary Reserve, 408
Royal Observer Corps, 26, 383, 444
Royal Pakistan Navy, 16, 400
Royal United Service Institution, 143
Russell, Admiral, the Hon Sir Guy, 16

Salan, General, 248
Sandys, Mr. Duncan, 27
Saunders, Air Chief-Marshal Sir Arthur P. M., 14
Saunders, Vice Air Chief-Marshal Sir Hugh, 9, 190
School of Maritime Reconnaissance, 314
Schuman, M. Robert, 476
Schuyler, Lieut.-General Gortland Van R., 9
Second World War: bomber in, 50; infantryman in, 35; Free French, 129; night attack, 294, 299; R.A.F. in, 52; U.S.A.F. in, 52, 53
Sée, Mr. P. H., 159
Sells, C. de Grave, 368
Seversky, Alexander de, 2, 50
Services, the: Belgian rifle, 157; domestic facilities, 157; taxation, 150
Shadwell Committee, 227
S.H.A.P.E.: air forces, first priority, 472; co-ordination of air activities, 389; French position, 476; not aggressive, 473
Shinwell, Mr. E., 155, 156
Ships, H.Ms: Achilles, 368; Alacrity, 31; Albion, 18; Ark Royal, 15, 18, 322; Black Prince, 368, 369; Britannia, 399;

Bulwark, 18; Centaur, 18; Cochrane, 368; Dundas, 18; Eagle, 32; Explorer, 7, 19; Gambia, 32, 290; Glory, 404; Illustrious, 287; Implacable, 401; Natal, 368, 369; Newcastle, 399; Perseus, 17; Prince of Wales, 287; Queen Elizabeth, 366; Redpole, 399; Repulse, 287; Salisbury, 18; Surprise, 399; Theseus, 290; Vanguard, 322, 399; Victorious, 18; Warrior, 368, 369
Ships, H.M.Cs: Magnificent, 167; Ontario, 168; Shearwater, 168
Simonds, Lieut.-General, 296
Simpson, General Sir Frank, 14
Singapore, main supply base, 417
Sixteenth Independent Parachute Brigade Group, 420
Slessor, Marshal Sir John, 118
South-east Asia, situation in, 8
Southern Rhodesia Air Training Group, 138
Spanish Armada, 106
Spanish Civil War, 124
Spanish Navy, 271
Special Air Service Regiment, 416
Stalin, Marshal, 59, 65, 67
Stevens, Air Marshal Sir Alick, 285
Stevens, Vice-Admiral J. F., 16
Stevenson, Mr. Adlai, 121
Strachey, Mr. E. J., 154
Stump, Admiral Felix B., 257
Swedish Navy, 272

Tanks: Alamein, 277; anti-tank weapons, 125, 279–81, 283; *blitzkrieg* methods, 125; Centurion, 202, 278, 284; Crocodile, 297, 303; historical survey, 275; Normandy landing, 276, 278; role of, 277; training, 281
Taranto, battle of, 146
Tedder, Lord, 192, 193, 194
The Shape of Wings to Come, 348
Thomas, Mr. J. P. L., 12, 320, 325, 358
Thompson, Wing-Commander H. L., 192
Treaty of Hué, 241
"Torch" Campaign, the, 192
Trieste, future of, 423
Trömso, battle of, 146
Truman, ex-President, 173
Tunisian Campaign, 298, 299
Turkish Navy, 272
Twining, General Nathaniel, 173

United Nations Charter, 120, 121
University of Princeton, 102
U.N.O.: inherent weaknesses, 151; President Eisenhower's speech to, 55
Uruguayan Navy, 273
U.S.A.: atomic weapons, 176, 177; budget, 174; defence expenditures, 173; E.D.C., 172, 176, 177; Eisenhower Administration, 172; Foreign Relations Committee, 174; German rearmament, 176; Indo-Chinese War, 175; National Guard, 178; Pakistan agreement, 176; resources, 70
U.S.A. Aircraft: Furys, 265; Guardians, 265; Sabres, 25, 85; Sea Darts, 265; Skyrays, 265; Skyrockets, 265
U.S.A. Navy: aircraft carriers, 261; appropriations, 256; aviation, 264–67; battleships, 261; cruisers, 262; destroyers, 263; general survey, 255–65; exercises, 260; Greek naval bases, 258; guided missiles, 259; Guppy programme, 259; "new look," 255; nuclear fission, 258; Spanish naval bases, 257; submarines, 263
U.S.S.R.: agricultural resources, 101; atomic weapons, 71; Communist Revolution, 61–66; conventional weapons, 70; defence budget, 267; hydrogen weapons, 71; main enemy, 68; Moscow fly-past, 59; world policy, 68–71
U.S.S.R. Air Force: Air Defence Command, 83; communications vulnerable, 86; defence, 84, 85; guided missiles, 83; jet-bombers, 85; radar, 82; size, 83; strategic bombing, 84
U.S.S.R., naval: Air Force, 80; bases, 76; building yards, 76; cruisers, 267; destroyers, 267; dockyards, 75; expansion, 81, 255; Fleet unbalanced, 77; Northern Sea Route, 75; ports, 67, 77; staff, 80; strength, 75, 80; submarines, 79, 81, 267; surface strength, 78

Venezuelan Navy, 273
Victoria Cross: awards, 24
V.2s, defence against, 237

War: Franco-German, 108; Polish-Russian, 106
War: First World, see First World War.
War (total): air warfare, 115; definition, 111; Far East, 120; nations at war, 113; new phenomenon, 112; old-style, 112; past wars, 112; production, 116; shifts of workers, 114; weapons, 117; women in, 113
War, Second World, *see* Second World War.
Ward, Mr. George, 153, 241
Warships, nomenclature: armoured, 142, 145; battleships, 144, 148; cruisers, 142, 145; Daring class, 141, 149; Fleet carriers, 141, 142; frigates, 143, 149; unarmoured, 142; 145
Waterloo, Wellington's forces at, 220
Wave-lift, 207
Wavell, Field Marshal, 276, 294
Waverley Committee, the, 427
Wellbeck College, 426
Weygand, General, 39
Wheeler-Bennett, Mr. John, 9
Whitaker, Sir Arthur, 409
Whittle, Sir Frank, 347
Wilkin, Rear-Admiral, 291
Wilson, Mr. Charles (U.S.A.), 173
Wolfe, General, 293
Wolff, S.S. General, 120
Women's Royal Naval Reserve, 408
Woomera, rocket range at, 7, 442
Wright, Admiral Jerauld, 10, 257
W.R.A.C., 21, 23, 427
W.R.A.C.(T.A.), 23
W.R.N.S., recruitment, 17

Yokoi, Rear-Admiral Toshiyuki, 6
Yugoslavian Navy, 272

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